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No. 268 DECEMBER 1957 Vol. LXVII

THE ECONOMIC JOURNAL

THE QUARTERLY JOURNAL OF THE ROYAL ECONOMIC SOCIETY

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LONDON: MACMILLAN AND CO. LIMITED
NEW YORK: THE ST. MARTIN'S PRESS
PRICE TEN SHILLINGS NET

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THE ECONOMIC JOURNAL

DECEMBER 1957

IS A WAGES POLICY DESIRABLE AND PRACTICABLE?[1]

IT would, I suppose, be possible to describe as a wages policy the present practice in this country whereby wages are settled by individual or collective bargaining in each industry or occupation, with little or no regard to the repercussions which wage movements may have upon the economy as a whole. But that is not what is usually meant when a wages policy is recommended. Lord Beveridge, for example, advocated a " unified wage policy " to ensure " that the demands of individual unions will be judged with reference to the economic situation as a whole." [2] That, I think, expresses in general terms what the advocacy of a wages policy is intended to imply. It is an alternative to the sectional determination of wages as we know it to-day.

The desire for such a policy springs from two main sources which may or may not be connected. On the one hand, there is the recognition that in a period of inflation the wage–price spiral is frustrating to all wage-earners and most injurious to some. Keynes, in 1940, put the point in these terms :

> " A demand on the part of the Trade Unions for an increase in money rates of wages to compensate for every increase in the cost of living is futile, and greatly to the disadvantage of the working class. Like the dog in the fable, they lose the substance in gaping at the shadow. It is true that the better off sections might benefit at the expense of other consumers. But except as an effort at group selfishness, as a means of hustling someone else out of the queue, it is a mug's game to play. In their minds and hearts the leaders of the Trade Unions know this as well as anyone else. They do not want what they ask. But they dare not abate their demands until they know what alternative policy is offered. This is legitimate. No coherent plan has yet been put up to them." [3]

The second source is bound up with the fact of full or over-full employment. If, as Lord Beveridge would have it, full employment means " more

[1] This formed the first contribution to a Discussion on the above topic at the Annual Genera Meeting of the Royal Economic Society held on July 4, 1957. Mr. Roberts, who made the second contribution, has published his views in the London and Cambridge Economic Service.

[2] *Full Employment in a Free Society*, p. 100.

[3] Keynes, *How to Pay for the War*, pp. 6–7.

jobs than men" a situation is created in which bargaining strength is heavily weighted on the side of the unions and, provided the monetary system is accommodating, it would be surprising if wages in general were not pushed up more than the overall increase in the productivity of labour.

One might point to other supporting sources. There are the economic planners, some of whom at least would recognise that both their nice calculations and their intelligent guesses may be reduced to nothingness if the wages sector of the economy is allowed to follow its own course while the remainder of the economy is tied to the plan. And finally there are those whose preoccupation is with the ethical aspects of wages distribution and who can see no way of promoting a fairer or "more right" distribution save by the conscious adoption of a wages plan. Without disrespect to those who hold these latter views, I think it may be claimed that they do not represent the main sources of the present interest in the possibility of adopting a wages policy. The present interest in the idea of a wages policy derives in the main from the inflationary setting in which the wages problem is cast, and from that viewpoint it makes no significant difference whether rising wages are regarded as a cause or as a consequence of the inflation.

But the advocates of a wages policy have not been outstandingly successful in their attempts to give substance to the idea. Lord Beveridge, writing in 1944, told us that "organised labour in Britain has sufficiently demonstrated its citizenship and responsibility to justify the expectation that it will evolve, in its own manner, the machinery by which a better co-ordinated wage policy can be carried through."[1] The passage of thirteen years, however, has done nothing to strengthen that expectation. In 1949 a United Nations Report on *National and International Measures for Full Employment* recommended that "if there is evidence of a continuous general upward pressure of money wages exceeding substantially the rate of increase of productivity and leading to offsetting price increases, the situation requires such action by the government, jointly with organised labour and employers' associations, as would ensure that any wage increases that may be granted will not result in a general wage inflation. The character of the action to be taken would naturally depend upon the conditions ruling in each country."[2] There is little help to be found in that prescription.

Perhaps it will be useful to ask two questions: Assuming a unified wages policy to be desirable, what kind of body should be established to effect or to promote the co-ordination? and What would be the appropriate scope of the deliberations of that body? The two questions are related and may be considered together.

In this country the trade unions have a strong dislike for any radical departure from the traditional sectional wage-bargaining procedure. The right to strike is still defended with almost religious fervour. And individual unions remain intensely jealous of their organisational autonomies. It

[1] *Full Employment in a Free Society*, p. 199. [2] *Op. cit.*, p. 43.

is one of the many paradoxes to which we have grown accustomed that with few exceptions trade-union leaders who are generally among the most vocal of economic planners express great indignation at any suggestion that the planning process should interfere in substance with the wage demands which are to be formulated either by themselves or by their members. In spite of this we have seen, in recent years, a very marked tendency for autonomous wage claims to conform to a standard pattern—*e.g.*, x shillings per week or y% or " a substantial increase in wages," which, the industrial correspondents of our newspapers proceed to inform us, " is understood to mean an increase of z shillings." But there is still no thought that the standardised claim should be discussed even informally if not in formal session between representatives of the unions as a whole and representatives of employers as a whole. Perhaps the reason is that the energy which might be devoted to the evolution of a wages policy is now concentrated on the adoption of suitable tactical procedures.

If this is correct, it has a most unfortunate effect on the system of industrial relations in this country. Under conditions of full employment tactics may suggest that wage demands should be pressed in the first instance not against the most prosperous industries but against industries which are deemed to be of great public importance but which, as it happens, are either not profitable or only barely profitable. And if success is achieved in that field, industries which are really profitable will have their resistance undermined even to demands for wage increases which are proportionately greater than any increase which may reasonably be expected in their labour productivity. Moreover, under the conditions which now prevail the rejection of a claim is represented as a " blunt refusal to negotiate," the assumption being that the only matter to be negotiated is the amount of the increase.

It is not difficult to conceive of countervailing tactics—if I may borrow a phrase from Professor J. K. Galbraith—on the employers' side, but in this case the chances of success, in the relatively short period, are not likely to be very great. And so we are led straight to the larger issues of economic, financial and monetary policy. When Lord Beveridge, in the passage quoted above, recommended the formulation of a unified wage policy he said explicitly that it was " unreasonable to expect from trade unions a reasonable wage policy, unless there is a reasonable price policy, just as much as it is impossible to have a price policy without a wage policy." Similarly, Sir Ralph Hawtrey argues: " Trade unionists, it may be said, ought, no less than the rest of the public, to accept considerations of public policy. And labour might reasonably be asked to co-operate with the Government in checking inflation, if the Government themselves were taking effective measures to do so." [1] Wages policy, if it is to be formulated, cannot be considered in a vacuum. It must have regard to Government

[1] *Times*, April 13, 1957.

policy and its efforts to restrain inflation. The appropriate wages policy when Governments are causing or are acquiescent in accepting inflation is obviously different from the appropriate wages policy when Governments are determined to stop inflation or hold it in check.

At this point the problem may be bedevilled by political chicanery. Sometimes we are told that the trade unions would be prepared to co-operate with a Labour Government but not with a Conservative Government or more precisely, that the co-operation of the unions on matters of wages depends upon the acceptance by Government of the views of the T.U.C. on the larger issues of fiscal, financial and monetary policy. I do not discuss the moral or political implications of this assertion except to point out that it has a bearing upon the terms of reference which might be assigned to any wages " body," and to suggest that any such " body " which might be created must at least be made cognisant of Government policy in the matter of inflation.

As against this viewpoint there is another which may be expressed in simple terms : If Goverment succeeds in the prevention of inflation a formalised wages policy is superfluous; if Government does not so succeed a formalised wages policy is doomed to failure. As in so much of the contemporary debate this seems to over-simplify the issue. Governments have now committed themselves to the pursuit of full employment as one of the ends of public policy, but it is not an end which can be considered in isolation without damage to the economy and injustice to its members. The pursuit of full employment without inflation or, if we allow for those who think that this may be impossible of attainment, with the minimum of inflation is an objective of policy which requires both the determination of Governments and the co-operation of the main economic groups within the community.

This co-operation, however, is not likely to be effective if the constituent parties to it are saddled with burdens which they cannot properly carry. In a broadcast talk in April 1956 Professor Kahn spoke of " the need to get the trade unions' representatives to consider the wage level as a whole and not in terms of the sectional interests of individual trade unions or workers." [1] But Professor Kahn went on to say that the approach by Government to the trade unions which he had in mind " would be based on the belief that a proper balance between imports and exports can and must be established." This balance, once established, would not have to be disturbed " at least for some time to come, through our wage costs going up faster than costs in other countries." The burden of defence would have to be taken as given and also " the burdens of housing, the social services, and such-like."

> " It then " [he says] " becomes a matter of the right division of what is left between consumption and productive investment in

[1] *Listener*, May 3, 1956.

extending and improving the equipment of industry. One would assume a continual growth of productivity; one would be dealing mainly with the destinations of the growth of production in the immediate future rather than holding a *post mortem* on the use of productive power in the immediate past."

Professor Kahn continues:

"it then does become a matter of a choice on behalf of wage-earners themselves between consumption and investment—between the interests of the immediate and of the more distant future. . . . Any agreement which could in this sort of way be arrived at as to the best balance between higher investment and higher consumption could easily be translated into terms of a suitable wages policy."

I can see no grounds for this optimism—as regards the ease with which the choice is to be made between the claims of consumption and those of investment and the ease with which this could be translated into terms of wages policy. It is no disparagement of trade-union leaders to say that few of them take much interest in these matters and fewer still are capable of pronouncing upon them. The main responsibilities of these trade-union officers are towards their own members, and they are not likely to be deflected from the exercise of these responsibilities by the acceptance of new burdens in the shaping of national economic policies. Professor Kahn does not tell us whether he expects Government to hand over its responsibility for major economic decisions to some body on which the trade unions would be represented or, in the event of the body being a negotiating body, what steps he thinks should be taken if agreement cannot be reached between the parties.

Considerable opposition has been expressed on both sides of industry to any suggestion that there should be some central body which would be empowered to settle either the total of wages to be paid or its allocation between different industries or groups of work people. This opposition is understandable, though it is generally focused against a proposal which is seldom advanced. A unified wages policy, in the setting of the system of industrial relations which operates in this country, would have to be the result of discussions between representatives of the two sides of industry with Government, perhaps, in an informative or advisory capacity. But difficulties arise at once. On both sides of industry the number of sectional interests which would claim entitlement to participate in these discussions would be so large that fruitful discussions would not be possible; and any serious attempt to overcome that difficulty would almost certainly founder on the refusal of important sectional organisations to surrender the autonomy which they now enjoy.

If some approach to a wages policy should be deemed to be desirable there are two lines along which that approach might conceivably be made.

The one might be called nation-wide bargaining. At present this exists in many industries but not for industry as a whole. In many of the industries where this scale of bargaining exists there are some grounds for supposing that it has introduced a number of undesirable rigidities into the wages structure. If the nation-wide bargaining were to include the whole of industry—assuming the organisational difficulties mentioned above to be overcome—these undesirable rigidities might well be developed on a much larger scale.

But to reject nation-wide bargaining is not to reject nation-wide discussions. As things now are, wage negotiations are conducted on a sectional basis, and considerations which relate to matters outside the narrower limits of the particular claim are introduced only for debating purposes. Even when differences are referred to arbitration the arbitrator must have strict regard to his terms of reference and the submissions of the parties. There is, at present, no means whereby leading representatives of the two sides of industry can examine, with or without the collaboration of Government, the larger issues of wages policy. It may be that a body which made this examination possible—provided it was not an astral body—could serve a useful, if modest, purpose and that its views would influence, without determining, the attitudes of the sectional interests. In this country there is a not unhealthy suspicion of excessive reliance on the authoritarian element in wage-fixing procedures; but it may be that the possibilities of informed and responsible persuasion have not yet been fully explored.

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A MODEL OF ECONOMIC GROWTH [1]

THE purpose of a theory of economic growth is to show the nature of the non-economic variables which ultimately determine the rate at which the general level of production of an economy is growing, and thereby contribute to an understanding of the question of why some societies grow so much faster than others. There is general agreement that the critical factors determining the trend rate of growth are to be sought in the savings propensities of the community (which determine the rate of capital accumulation), the flow of invention or innovation (which determines the rate of growth of productivity) and the growth of population. Until recently, these factors were regarded as the parameters of a growth model—*i.e.*, as non-economic variables which are invariant with respect to changes in the other variables—and theoretical inquiry was confined to the more modest task of showing the particular relationships that must prevail between the values of these different parameters in order that they should be consistent with a steady rate of growth for the economy as a whole. But more recently, there has been an increasing awareness of the fact that neither the proportion of income saved nor the rate of growth of productivity per man (nor, of course, the rate of increase in population) are independent variables with respect to the rate of increase in production; and that the actual rate of progress of a capitalist economy is the outcome of the mutual interaction of forces which can adequately be represented only in the form of simple functional relationships (like supply or demand curves) rather than by constants. The purpose of this paper is to present a simple model of economic growth based on a minimum number of such relationships.[2]

A satisfactory model concerning the nature of the growth process in a capitalist economy must also account for the remarkable historical constancies revealed by recent empirical investigations. It was known for some time that the share of wages and the share of profits in the national income has shown a remarkable constancy in " developed " capitalist economies of

[1] This paper owes a great deal to discussions with Professor D. G. Champernowne, both in its general ideas and even more in the detailed presentation of the mathematical parts of the argument. I am particularly indebted for his help in working out the implications of the assumptions in mathematical terms, and for the mathematical proofs of some of the propositions made, though he bears no responsibility for the choice of assumptions underlying the models.

[2] The present paper represents an elaboration and further development of ideas put forward in two earlier papers by the author, " Alternative Theories of Distribution," *Review of Economic Studies*, Vol. XXIII, No. 2 (March 1956), pp. 94–100, and " Capitalist Evolution in the Light of Keynesian Economics," a lecture delivered at the University of Peking in May 1956, and reprinted in *Sankhyā* (*Journal of the Indian Statistical Institute*), Vol. 18, Parts 1 and 2, June 1957. Reference may perhaps also be made to two former papers by the author which set out the reasoning underlying some of the arguments and assumptions in more detail, " Mr. Hicks and the Trade Cycle," ECONOMIC JOURNAL, December 1951, pp. 833–844, and the " The Relation of Economic Growth and Cyclical Fluctuations," ECONOMIC JOURNAL, March 1954, pp. 53–71.

the United States and the United Kingdom since the second half of the nineteenth century.[1] More recent investigations have also revealed that whilst in the course of economic progress the value of the capital equipment per worker (measured at constant prices) and the value of the annual output per worker (also in constant prices) are steadily rising, the trend rates of increase of both of these factors has tended to be the same, so as to leave the capital/output ratio virtually unchanged over longer periods.[2] This means that while progress involved a continuous increase in the amount of capital used per worker—whether capital is measured in terms of an index number of the value of capital goods at constant prices, in terms of horse-power per man or in tons of steel embodied in equipment per operative, etc.—there was no "deepening" of the capital structure in the economist's sense: no increase in the amount of "waiting" per unit of current output, or in the ratio of "embodied" to "current" labour, or in the length of some (arbitrarily measured) "investment period."[3] Constancy in the share of profit and in the capital/output ratio also involves constancy in the rate of profit earned on investments (in the "marginal efficiency" of capital), and this again appears to be confirmed by empirical investigations.[4] Existing theories are unable to account for such constancies except in terms of particular hypotheses (unsupported by any independent evidence), such as the unity-elasticity of substitution between Capital and Labour,[5] or more recently, con-

[1] For the United Kingdom the share of wages has shown only small variations around the level of 40% of the national income in the period 1840–1950. (Cf. Phelps Brown and Hart, "The Share of Wages in the National Income," ECONOMIC JOURNAL, June 1952, pp. 253–77.) In the United States the share of wages and salaries remained constant at around 60% of the national income up to about 1929, and has since shown a rising trend, mounting to 69% in the post-war decade, while the share of profits and property income (dividends, interest and rent) declined since 1929 from 38 to around 30%. Some of this change no doubt reflects the rise in wage and salary earners as a proportion of the total population. (Cf. Kuznets, "Long Term Changes in the National Income of the U.S.A. since 1870," *Income and Wealth*, Series II.)

[2] According to Mr. Maiwald's calculations based on fire-insurance figures, the capital/output ratio in Britain remained practically unchanged in the period 1870–1914 (at around 3·3) and fell slightly (to around 3·0) in the period 1914–38 (*Economic History Review*, Part I, 1956, p. 102). The same impression is gained from the study of Phelps Brown and Weber ("Accumulation, Productivity and Distribution in the British Economy, 1870–1938," ECONOMIC JOURNAL, June 1953, pp. 263–88) for the period 1870–1900, though they indicate a rising ratio for the period 1900–14, and a falling ratio for 1924–38. In the United States the capital/output ratio has shown a slightly rising trend from the decade 1879–88 to the decade 1909–18, and a falling trend since, and (ignoring the depression period) is not significantly different now (at around 3·0) than it was sixty years ago. (Cf. Fellner, *Monetary Policies and Full Employment*, Table 3, p. 80), based on Kuznets' estimates.)

[3] The usual explanation for this apparent paradox is, of course, that the productivity of labour increased at the same rate in the capital-goods-making industries (taken as a group) as in the economy as a whole (*i.e.*, in all industries taken together) as a result of the peculiar character of technical progress (the "neutrality" of inventions). As will be shown below however no such assumption is necessary for explaining the constancy of the capital/output ratio.

[4] According to Phelps Brown and Weber (*loc. cit.*) the rate of profit on capital in the United Kingdom (including buildings) remained remarkably steady at around 10½% in the period 1870–1914, the annual variations being within the range of 9¼–11¼%. The same steadiness is shown in the United States in the relationship of property income to total capital (cf. Kuznets, *loc. cit.*)

[5] Hicks, *Theory of Wages* (1932) Ch. VI, *passim*.

stancy of the degree of monopoly or the " neutrality " of technical progress.[1] One of the merits of the present model is that it shows that the constancy in the capital/output ratio, in the share of profit and in the rate of profit can be shown to be the consequence of endogeneous forces operating in the system, and not just the result of some coincidence—as, *e.g.*, that " capital saving " and " labour saving " inventions happened (historically) to have precisely offset one another, or that the growth in monopoly happened (historically) to have been counterbalanced by the fall in raw-material prices in terms of finished goods.[2]

Basic Properties of the Model

The present model is based on Keynesian techniques of analysis and follows the well-known " dynamic " approach originally developed by Mr. Harrod [3] in regarding the rates of change of income and of capital as the dependent variables of the system. The properties of our model differ, however, in important respects from those of Mr. Harrod and other writers, and these differences can be traced to the following:

(1) It is assumed here that in a growing economy the general level of output at any one time is limited by available resources, and not by effective demand. The model in other words assumes " full employment " in the strictly Keynesian sense—a state of affairs in which the short-period supply of goods and services in the aggregate is inelastic and irresponsive to further increases in monetary demand. This need not necessarily imply the full employment of labour except in a developed economy where the available capital equipment is sufficient or more than sufficient to employ the whole of the available working force. But it does imply that, excepting for periods in which the process of growth through capital accumulation (for reasons outlined later) is altogether interrupted, the system cannot long operate in a state of (Keynesian) under-employment equilibrium, because at any level of output short of " full employment " the aggregate demand associated with that particular level of output will exceed the aggregate supply price of that output, and thus lead to an expansion in output until a state of full employment is reached. In a state of full employment, on the other hand, aggregate demand and aggregate supply (in real terms) are brought into equality through the movement of prices in relation to prime costs, *i.e.*, the relation of prices to wages. (It is assumed that any rise in prices in relation to wages increases savings relative to investment and thus reduces aggregate

[1] Kalecki, *Essays in the Theory of Economic Fluctuations*, Chapter I; Harrod, *Towards a Dynamic Economics*, p. 23; Joan Robinson, *The Rate of Interest and Other Essays*, pp. 90–97, and *The Accumulation Capital*, pp. 73–100.

[2] Kalecki, *op. cit.*, pp. 32–34.

[3] " An Essay in Dynamic Theory," Economic Journal, March 1939, subsequently elaborated in *Towards a Dynamic Economics* (Macmillan, 1949). Substantially the same analysis was put forward in the well known article by Domar (*Econometrica*, 1946).

demand in real terms, and vice versa).[1] The assumption that there can be no under-employment equilibrium in periods in which the rate of growth of capital and income is normal is not arbitrary; it is based on the view that an equilibrium of steady growth is inconsistent with under-employment equilibrium. For in the latter situation the relationship of prices and wages is determined by extraneous factors (such as the " degree of monopoly," full-cost pricing, Marshall's " traditional margin of profit on turnover " or what not) and, as will be shown below, these either yield an insufficient ratio of savings to income (in which case, in a growing economy, the system is not stable *below* full employment) or else an excessive ratio of savings to income (in which case, for reasons described by Mr. Harrod,[2] the process of growth cannot continue, and the system will relapse into stagnation). A state of Keynesian under-employment equilibrium, whilst it is perfectly consistent with a static short-period equilibrium, is therefore inconsistent (except by a fluke) with a dynamic equilibrium of steady growth.[3]

The Keynesian techniques of analysis were originally designed, of course, to explain how an economy can remain indefinitely in a state of under-employment equilibrium; it may seem at first sight paradoxical therefore to label a model " Keynesian " if it is based on the full-employment assumption. However, as I argued in an earlier paper [4] the specifically Keynesian apparatus of thought can be applied to full-employment situations and not only to under-employment situations, and there is some evidence that in an earlier stage in the development of his ideas (in *A Treatise on Money*) Keynes applied the multiplier principle—the idea that is, that expenditure decisions determine income and savings rather than the other way round—for the purpose of a price theory rather than an employment theory, even though in the *General Theory* he explicitly disclaimed that his ideas had any relevance to full-employment conditions.[5] Yet the specifically Keynesian hypothesis that

[1] Any sharp and clear-cut distinction between an under-employment equilibrium, where production is limited by effective demand, and a full-employment-equilibrium, where it is limited by available resources, presumes, of course, something like a reverse L-shaped supply function for output as a whole, so that marginal costs are either infinite (or indefinite) or else equal to average prime costs, and thus in neither case exert an important influence on the ruling relationship between prices and wages. In reality there is a twilight zone of semi-full employment in which the supply of goods and services in the aggregate is neither elastic nor inelastic, and in which an increase in money demand will increase both prices and production in roughly equal measure. For the purposes of the present model it will be assumed that this " twilight zone " is sufficiently narrow in range to be left out of consideration altogether. (Its introduction would complicate the exposition without radically altering the basic features of the model.)

[2] " An Essay on Dynamic Theory," *loc. cit.*, pp. 23–26; *Towards a Dynamic Economics*, pp. 77 ff.

[3] I believe it was Mr. Harrod's failure to see the inconsistency between a continuous under-employment equilibrium and a state of steady growth which led him to the belief that a dynamic equilibrium of growth is necessarily unstable. His proposition applies only if the savings coefficient is extraneously determined, and this in turn presumes a state of affairs where short-period output is elastic. It does not apply to full employment or even to the " twilight zone " of semi-full employment.

[4] " Alternative Theories of Distribution," *loc. cit.*, p. 94.

[5] *General Theory*, pp. 3, 26 and 112.

equilibrium between savings and investment is secured through a movement of prices and/or incomes, rather than through changes in the rate of interest, is just as fruitful in the context of a dynamic growth model based on the postulate of full employment as in a (short-period) static model based on the postulate of under-employment; nor does the postulate of full employment appear as unrealistic at the present day (at any rate in the context of a dynamic theory of growth) as it appeared in the 1930s. Although the great depression of the 1930s was both more severe and more prolonged in duration than its predecessors, the gloomy forebodings made at the time that it heralded the approach of an era of long-term economic stagnation have certainly proved premature: since 1945 the momentum of growth in the capitalist economies has been at least as strong as in any comparable period since 1870. It does not therefore seem unrealistic to assume that capitalist economies operate under full-employment conditions in all such periods (and these appear to take up the majority in terms of chronological time) when capital is accumulating and the national income is growing. Similarly, in the case of under-developed economies, whilst there may be vast numbers of unemployed or under-employed the situation is not one of Keynesian under-employment as the supply of goods is in general inelastic in the short period and irresponsive to increases in monetary demand. Here again it certainly appears more correct to assume that output at any one time is limited by the scarcity of resources rather than by effective demand.

(2) The second main respect in which the present model departs from its predecessors is that it eschews any distinction between changes in techniques (and in productivity) which are induced by changes in the supply of capital relative to labour and those induced by technical invention or innovation—*i.e.*, the introduction of new knowledge. The use of more capital per worker (whether measured in terms of the value of capital at constant prices, in terms of tons of weight of the equipment, mechanical power, etc.) inevitably entails the introduction of superior techniques which require " inventiveness " of some kind, though these need not necessarily represent the application of basically new principles or ideas. On the other hand, most, though not all, technical innovations which are capable of raising the productivity of labour require the use of more capital per man—more elaborate equipment and/or more mechanical power. Hence the speed with which a society can " absorb " capital (*i.e.*, it can increase its stock of man-made equipment, relatively to labour) depends on its technical dynamism, its ability to invent and introduce new techniques of production. A society where technical change and adaptation proceed slowly, where producers are reluctant to abandon traditional methods and to adopt new techniques is necessarily one where the rate of capital accumulation is small. The converse of this proposition is also true: the rate at which a society can absorb and exploit new techniques is limited by its ability to accumulate capital.

It follows that any sharp or clear-cut distinction between the movement *along* a " production function " with a given state of knowledge, and a *shift* in the " production function " caused by a change in the state of knowledge is arbitrary and artificial.[1] Hence instead of assuming that some given rate of increase in productivity is attributable to technical progress which is superimposed, so to speak, on the growth of productivity attributable to capital accumulation, we shall postulate a single relationship between the growth of capital and the growth of productivity which incorporates the influence of both factors. The plausible shape of this " technical progress function " is that given by the curve TT' in Fig. 1. Let C_t and O_t represent the capital per worker and the annual output per worker at time t, so that $\frac{1}{C_t}\frac{dC}{dt}$ (measured horizontally) represents the annual percentage growth in capital per worker, and $\frac{1}{O_t}\frac{dO}{dt}$ (measured vertically) the annual percentage growth in output per man. The shape and the position of the curve reflect both the magnitude and the character of technical progress as well as the increasing organisational, etc., difficulties imposed by faster rates of technical change. It may be assumed that *some* increases in productivity would take place even if capital per man remained constant over time, since there are always some innovations—improvements in factory lay-out and organisation, for example—which enable production to be increased without additional investment. But beyond these the growth in productivity will depend on the rate of growth in the capital stock—clearly the more capital is increased, the more labour-saving technical improvements can be adopted, though there is likely to be some maximum beyond which the rate of growth in productivity could not be raised, however fast capital is being accumulated. Hence the TT' curve is likely to be convex upwards and flatten out altogether beyond a certain point. The postulate of the existence of a given curve presumes, of course, a constant flow in the rate of new ideas over time. Variations in the flow of new ideas, and in the readiness with which they are adopted, are likely to be reflected in shifting the height of the curve rather than in altering its general character.[2] In an unprogressive economy, with a low capacity to absorb technical change the height of the TT' curve will be relatively low (as in the dotted line in Fig. 1), whilst important new discoveries (such as the invention of the internal combustion engine or atomic energy) are likely to raise the position of the curve considerably for some time.

P represents the particular point on the TT' curve where it is crossed by

[1] The technical possibilities shown by the " production function " of any one period are in fact nothing more than the reflection of the yet unexploited inventions and innovations of the past.

[2] Our TT' curve thus reflects not only " inventiveness " in the strict sense, but the degree of technical dynamism of the economy in a broader sense—which includes not only the capacity to think of new ideas, but the readiness of those in charge of production to adopt new methods of production.

a line drawn from the origin at an angle of 45 degrees—where, in other words, the percentage rate of growth of capital and the percentage rate of growth of output are equal. When the rate of capital accumulation is less than this rate the percentage rate of growth in output will exceed the growth in capital (involving a fall in the capital/output ratio), and vice versa.

The recognition of the existence of a functional relationship between the proportionate growth in capital and the annual proportionate growth in productivity shows the futility of regarding the movements in the capital/

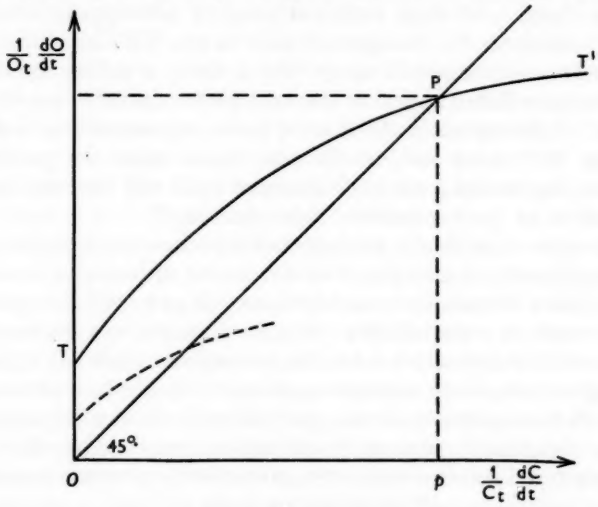

FIG. 1

output ratio as dependent upon the technical character of the stream of inventions—according as they are predominantly "labour-saving" or "capital-saving" in character.[1] For whether the capital/output ratio will be rising or falling will depend not on the technical nature of the inventions, but simply on the relationship between the flow of new ideas (characterised by the shape and position of our TT' curve) and the rate of capital accumulation. If capital accumulation is less than adequate to exploit the current stream of inventions to the point where the growth of capital and the growth in output are equal—if the actual position is to the left of P—the capital/output ratio will be falling, and the character of inventions will appear to be predominantly "capital-saving" in nature; if the position is to the right of P they will appear to be predominantly "labour-saving" in nature.[2] As will be shown below, with a given TT' curve, the system will always tend

[1] Cf. Harrod, *op. cit.*, p. 23; Joan Robinson, *op. cit.*, pp. 164 ff.

[2] New techniques capable of raising the productivity of labour in any given proportion will, of course, be all the more profitable the less additional capital they require for adoption. It is evident, therefore, that relatively labour-saving and capital-using innovations are the more likely to be adopted the higher the rate of capital accumulation.

towards the point where the growth of capital and the growth in productivity are equal—P is therefore the long-run equilibrium point and Op the long-run equilibrium rate of growth. (The basic reason for this is that if the rate of capital accumulation is less than Op, it will tend to be stepped up and the rate of profit on new investment will rise over time; in the converse case, the rate of growth of capital will tend to be slowed down, and the rate of profit will fall. It is only when capital and output grow at the same rate, and the capital/output ratio is constant, that the rate of profit remains constant over time; and then technical progress will appear to take on a "neutral" character.[1]) An upward shift in the TT' curve caused by a burst of new inventions will cause (for a time) a falling capital/output ratio; progress will thus appear to take on a predominantly "capital-saving" character. A drying up in the flow of ideas, represented by a downward shift in the TT' curve will, on the other hand, cause the growth of productivity to lag behind; the capital/output ratio will rise, and innovation will appear to be predominantly "labour-saving."

This is not to deny that *in particular industries* the capital/output ratio may change significantly in an upward or downward direction as a result of the character of new inventions occurring there. If an important capital-saving invention occurs in some industry—due, for example, to some revolutionary improvement in design which raises the productive capacity of capital equipment of a given value—the capital/output ratio in that industry is bound to fall. But precisely because this involves a gradual rise in the rate of profit, and thus in the rate of capital investment, it will induce compensating changes in the capital/output ratio of other industries, so that for the economy as a whole (and in the long run) the overall capital/output ratio will tend to remain constant.

(3) Our model, like other macro-economic models, is based on simple aggregative concepts of income, capital, profits, wages, investment and savings, expressed in real terms—*i.e.*, in terms of values of constant purchasing power. This raises all the familiar difficulties involved in the use of index numbers, as well as the more fundamental questions of the measurement of the quantity of capital. The measurement of the stock of capital in terms of money values corrected for price changes raises peculiar problems of its own on account of: (i) the fact that owing to technical progress, the capital goods produced in any one period are physically non-identical with the capital goods produced in previous periods, and therefore cannot simply be *added* to the latter, even if the proportions of the different capital goods serving different end-uses remained the same; [2] (ii) that the *value* of the stock

[1] cf. pp. 609–10 below.

[2] Much the same problem arises, of course, in the measurement of real income, since in a progressive economy new kinds of commodities are constantly being introduced. But whereas in the case of income, the changing character and composition of the constituents could be ignored in the first approximation (by assuming, *e.g.*, a single type of consumption good, such as "bread") in the case of capital goods it cannot, since it is the essence of a change of techniques that the character of the instruments, etc., used in production changes.

of capital existing at any moment is not the sum of the values of the capital goods produced in the past, but is that quantity *less* accrued depreciation.

Whatever may be the situation as regards the "stationary states" of neo-classical theory, there can be no question that in a developing economy with constantly changing knowledge and techniques neither the problem of equating the capital goods produced at different dates and at differing states of knowledge nor the measurement of depreciation admits of any clear-cut theoretical solution: the measurement of the stock of *real* capital must therefore necessarily be based on some (more or less arbitrary) convention. One such convention would measure the stock of real capital in terms of the amount of mechanical power which the outstanding stock of capital goods (or the addition to it in a particular year) represents. Another such convention (which appears rather less arbitrary) measures it in terms of the total weight of steel embodied in the capital equipment.[1] For the purposes of this model we shall adopt the latter convention. We shall also assume that the average price, per ton of steel, of finished capital goods produced in successive periods remains constant in terms of income units so that the rate of growth of capital is the same in "steel" as in terms of real income. (This assumption, while it greatly simplifies the exposition, is not an essential feature of the model.) With regard to depreciation, we shall assume: (*a*) that individual capital goods retain their physical efficiency until they are scrapped; (*b*) that the proportion of the outstanding capital stock which is scrapped in any one year (again measured in tons of steel) is a constant fraction of the total stock of capital. Hence we shall define depreciation as the value of that part of the output of capital goods produced in any one period which is needed to maintain the total weight of steel in the outstanding capital stock constant (and which, in a steadily growing economy, is also a constant fraction of total turnover). We shall define income, savings, investment *net* of depreciation in this special sense of the term "net." The difference between gross and net income and gross and net savings will be assumed to be identically equal to the difference between gross and net investment.[2]

(4) It is evident from the foregoing that the prime mover in the process of economic growth is the readiness to absorb technical change combined with the willingness to invest capital in business ventures. It is through the continued increase in the amount of machinery, etc., used in combination

[1] Another variant of this kind of measurement would be the total physical weight of all capital goods produced (of whatever material it consisted).

[2] It would also be possible, of course, to value capital at the original cost of installation of capital goods less accrued depreciation (the latter being spread over the physical life of the assets, either by the straight-line method, the reducing-balance method, etc.) and deflated by an index of capital-goods prices. But the point is that the application of a price index to the historical cost of the capital goods produced at different periods implicitly makes use of some kind of convention of the type introduced here explicitly. (Measuring capital in terms of value deflated by capital-goods-prices is not the same, of course, as valuing capital in real income units; but the complications due to the differences between the two will not be gone into here.)

with labour that the productivity of labour is continuously increased. In a capitalist economy the process of accumulation is the resultant of innumerable investment decisions made by entrepreneurs—using this term in a broad sense, so as to comprise the owners of risk capital generally, as well as the Boards of Directors of companies who take the actual decisions on their behalf. Any act of investment the outcome of which is necessarily uncertain at the time the decisions are taken, implies an act of faith—it involves a favourable judgment concerning the future course of markets, as well as the future relationship of prices and costs. Unless entrepreneurs are willing to revise their estimates of future sales and profits upwards in the light of current experience—unless they are imbued with sufficient optimism to react favourably to favourable events, and to increase the amount of capital invested in response to an increase in current sales and profits—it is difficult to envisage the growth of production and capital as a continuous process. For unless the capacity to produce is continually increased, the increase of production must necessarily come to a halt; a continued growth in output capacity presupposes in turn a belief (which must be grounded, and can only be grounded, in past experience) in the continued growth in markets. In order that there should be continued growth, it is necessary therefore to suppose both that, on the one hand, output increases as a result of capital investment and, on the other hand, investment takes place in response to an increase in output. Hence as a complement to our technical progress function which denotes the former we must postulate a function based on assumptions concerning entrepreneurial psychology to denote the latter. With regard to this second function, which we shall call the investment function, it will be assumed: (i) that given the (expected) rate of profit on capital, entrepreneurs desire to maintain a constant relationship between the amount of capital invested and their turnover; (ii) that this relationship between desired capital and turnover is an increasing function of the expected rate of profit on capital; [1] (iii) that the investment decisions of each " period " are governed by the condition that actual capital is to be brought into line with desired capital, the length of the " period " being so defined as to make it technically feasible to eliminate in one period the backlog of investment (the difference between desired and actual capital) existing at the beginning of the period; [2] (iv) that entrepreneurs expect the same growth in turnover

[1] The assumption that for each enterprise there is some *desired* amount of invested capital in relation to turnover which is itself a rising function of the rate of profit can be justified by the greater risk and uncertainty of expectations for the more distant future as against the nearer future and the consequent preference (at equal rates of expected return) for investments with a more rapid turnover of capital as against investments which entail a longer period of inevitable commitment. A high capital/output ratio implies a longer period of commitment because it implies a higher ratio of fixed capital to circulating capital (irrespective of any differences in the durability of fixed capital).

[2] As we shall see later (cf. pp. 619–20 below) this assumption is applicable only to an " advanced " capitalist economy in which, at the ruling rate of profit, the capital stock in the various industries has already been brought into the desired relationship with turnover, so that net investment takes place only in response to a rise in the (expected) turnover or a rise in the rate of profit.

in the coming period as was actually attained in the previous period; (v) that they expect to obtain the same margin of profit on turnover in the coming period as actually obtained in the previous period.

These assumptions imply an investment function which makes investment of any period partly a function of the change in output in the previous period [1] and partly of the change in the rate of profit on capital in that period. They are not, of course, the only possible assumptions that one could choose in this regard. It would be possible to assume, for example, that investment, at any given rate of profit, is a constant percentage addition to the existing stock of capital, rather than a coefficient related to the increase in turnover.[2] But in a model which makes the amount of profits actually generated in the production process dependent on the rate of investment and makes the rate of investment in turn dependent on the growth of profits, it is necessary to postulate a certain minimum " buoyancy " in entrepreneurial behaviour in order to ensure that the investment necessary to generate the profits which call forth a further increase in investment in the next period actually *does* take place, so that productivity, total output, profits and investment continue to grow. Without assuming a certain minimum of " buoyancy," the mere accrual of fresh investment opportunities through technical progress will not alone ensure the continued growth in production [3]—since the latter requires in addition that effective demand and profits should

[1] In earlier articles on the trade cycle (cf. ECONOMIC JOURNAL, March 1940, p. 79, and ECONOMIC JOURNAL, December, 1951, p. 837) I strongly criticised the use of the acceleration principle in connection with trade-cycle models, because it assumes a constant relationship between output and capital (or rather between output and output capacity), whereas the recognition of a changing relationship between these two seemed to me essential for an understanding of the cyclical mechanism. I recognised, however, the validity of the principle " as between alternative positions of long period equilibria " (*ibid.*, p. 838). For the purpose of a long-run model of economic growth it is legitimate to divide time into " periods " long enough for the capital stock in any one period to be fully adjusted to the output expected for that period at the beginning of that period; which means that the " acceleration principle " is an appropriate principle to apply to characterise investment behaviour for such " periods."

[2] On the implication of this latter assumption cf. p. 610, note 1 below. The difference between these two kinds of assumptions relating to investment behaviour may be explained as follows. The postulate of an investment function where the rate of increase of the stock of capital (*i.e.*, the rate of investment as a proportion of the existing stock of capital) is treated as an increasing function of the rate of profit on capital implies the assumption that entrepreneurial risk is an increasing function of the rate of capital accumulation, irrespective of the relation between the growth of the capital stock and the growth of turnover. It thus corresponds to Keynes' declining marginal-efficiency-of-capital function, as re-interpreted by Kalecki's principle of increasing marginal risk. The postulate of an investment function where the desired stock of capital in relation to turnover is treated as an increasing function of the rate of profit on capital implies, on the other hand, that the principle of increasing risk is not applicable to the rate of capital accumulation as such, but only to a situation where the (proportionate) rate of capital accumulation exceeds the rate of growth of turnover. This seems a more reasonable supposition for so long as the growth of capital merely keeps pace with the growth of turnover there seems to be little empirical justification for the belief that a faster rate of growth of capital entails a higher subjective marginal risk to the entrepreneur. This latter assumption, moreover, as will be shown below, is consistent with a stable equilibrium of steady growth whereas the former is not.

[3] Cf. ECONOMIC JOURNAL, December 1951 p. 842.

increase sufficiently to match the growth in potential supply, and thus keep the process of accumulation going.

(5) We shall assume that monetary policy plays a purely passive role—which means that interest rates, subject to differences due to borrowers' risks, etc., follow, in the long run, the standard set by the rate of profit obtainable on investments. The operation of our model is consistent with continued price-inflation (with money wages rising faster than productivity) or with a constant price level (money wages rising *pari passu* with productivity). It is in principle also consistent with constant money wages (money prices falling with the rise in productivity), though the latter situation might give rise to additional complications as regards investment behaviour which will not be gone into here. We shall deal with the case of isolated communities only—*i.e.*, we shall ignore the problems arising in connection with trade between regions in differing stages of development.

(6) We shall ignore also the influence of a change in the share of profits and wages and of a change in rate of profit on capital (or of interest rates) on the choice of techniques adopted which has been the focal point of attention of neo-classical theory.[1] At any one time the individual entrepreneur has, of course, a variety of " techniques " to choose from, and he may be assumed to choose the particular technique which secures the lowest cost, or the highest rate of return, on his investment. It seems reasonable to assume, however, that the choice of technique is far more dependent on the prevailing prices of different types of capital goods and on the price of labour in terms of commodities generally (in so far as this reflects the productivity of labour) than on the prevailing rate of profit or the prevailing interest rates. If an entrepreneur in an advanced economy employs bulldozers for making roads, whilst his opposite number in an under-developed country employs only shovels, this is not, to any significant degree, the consequence of differences in the prevailing rates of profit (or of the rates of interest on loans) in the two communities, but simply of the fact that the price of bulldozers in terms of shovels is much lower in the advanced community than in the primitive community. As an economy progresses as the combined result of capital accumulation and technical progress the prices of " superior " capital goods (capable of securing a higher output per unit of work) may be assumed to fall continuously relative to inferior capital goods: the character

[1] The importance attributed in neo-classical theory to the choice between more or less labour-saving and capital-using techniques being dependent on the rate of profit (or the rate of interest) is, of course, inherently connected with the acceptance of the marginal productivity theory as the basic principle in the explanation of the pricing process and the determination of distributive shares: for it is the choice among a range of techniques requiring more or less capital (and less or more labour) per unit of output which alone makes it possible (theoretically) to assign specific marginal productivities to the factors of production, Capital and Labour, in the long run. Our model, however, shows that for the system as a whole the share of wages and of profits, and the rate of profit on capital is determined quite independently of the principle of marginal productivity; the choice of alternative methods of production differing in " capital intensity " at any *given* state of knowledge loses therefore its central importance in the theoretical scheme.

of the most economical type of equipment will continually alter. This alone is sufficient to explain why it becomes profitable to employ bulldozers once a certain level of capital accumulation has been attained which has not been profitable at a lower stage of accumulation.[1] If, in addition, the use of the bulldozer-technique involves a higher investment per unit of output (a higher capital/output ratio) than the shovel-technique (which is by no means necessarily the case!) it will also be true that the rise in wages in terms of commodities, associated with the growth in the productivity of labour, will contribute to making the bulldozer-technique profitable at a certain stage of development.[2] In the latter case it may further be true that the use of bulldozers will be stimulated not only by the rise in wages due to the growth of productivity, but also by a rise in the *share* of wages at any given level of productivity due to a fall in profits. Thus as between two growing communities with equal technical progress functions, but in one of which the rate of profit is lower than in the other (due to a higher propensity to save out of profits and/or wages) the introduction of bulldozers may occur at a somewhat earlier stage of development (at a lower level of productivity and capital accumulation) than in the high-profit community, which in turn may have repercussions on the speed of development—at any rate during an intermediate stage, until an equilibrium of steady growth is attained. But we shall regard these as secondary complications which can safely be neglected in the first approximation; which means that we shall regard the choice of techniques as entirely a matter of the relative prices of different types of capital goods, which can be assumed to alter with the accumulation of capital and the progress of techniques in the capital-goods making industries.

[1] It may be thought that, given international trade, a particular under-developed country, in accordance with the law of comparative costs, would export shovels and import bulldozers and thereby gain the same terms of choice (as between different techniques) as the advanced country. But this pre-supposes a potential market for inferior capital goods in the advanced country (as well as a potential market for superior capital goods in the primitive country) which is non-existent.

[2] The fall in the price of bulldozers in terms of shovels will, of course, reduce the capital/output ratio involved in the bulldozer-technique relatively to the shovel-technique; and it may be supposed that at a certain stage of development the capital/output ratios in the two techniques will become identical. But whether this stage will have been reached or not at the time when the introduction of the bulldozer technique becomes profitable will depend (in part) on the rate of growth of productivity in the bulldozer-making industry relative to the rate of growth in the productivity of labour in the economy in general. The lower the former is relative to the latter, the more its introduction will have been prompted by the rise in wages (in terms of commodities in general) and the less by the fall in the price of bulldozers relative to shovels. If the introduction of the bulldozer technique has in the main been due to the rise in wages, and not to the fall in its price in relation to shovels, its introduction is in the nature of a " compensating " labour-saving innovation prompted by the introduction of capital-saving innovations in other parts of the economy. The fact that in the course of progress the prices of " superior " capital goods fall continually in relation to relatively inferior capital goods is not, of course, inconsistent with our assumption (stated on p. 599 above) that the price of newly produced capital goods per ton of steel embodied remain constant in terms of consumption goods.

The Working of the Model

We are now in a position to set out the essential features of the model. We shall examine its mode of operation in two stages—first, under the hypothesis of a constant working population and second by allowing for population growth. In the former case (constant full employment being assumed) the proportionate rate of growth in total real income, Y_t, will be the same as the proportionate rate of growth in output per head, O_t. In the latter case the proportionate change in total real income will be the sum of the proportionate change in productivity, O_t, and the proportionate change in the working population, L_t.

(a) *Constant Working Population*

We shall postulate: (i) given savings propensities for profit-earners and wage-earners, respectively; [1] (ii) that the investment decisions in any one period are governed by the desire to maintain the capital stock in a given relationship to turnover, modified by any change in the rate of profit on capital; (iii) a given technical relationship between the (proportionate) rate of growth in productivity per man and the (proportionate) rate of growth in capital per man. Writing Y_t, K_t, P_t, S_t, I_t for real income, capital, profits, savings and investment at the time t, we may assume the familiar income identities

$$S_t \equiv I_t \equiv K_{t+1} - K_t$$

To represent our three relationships mentioned above we shall, for expository purposes, adopt linear equations as follows:

(1) *Savings Function*

$$S_t = \alpha P_t + \beta(Y_t - P_t)$$

where $$1 > \alpha > \beta \geqslant 0$$

(2) *Investment Function*

$$(2.1)\quad K_t = \alpha' Y_{t-1} + \beta' \left(\frac{P_{t-1}}{K_{t-1}}\right) Y_{t-1}$$

$$(2.2)\quad I_t = K_{t+1} - K_t = (Y_t - Y_{t-1})\left(\alpha' + \beta' \frac{P_{t-1}}{K_{t-1}}\right) + \beta' \left(\frac{P_t}{K_t} - \frac{P_{t-1}}{K_{t-1}}\right) Y_t$$

where $$\alpha' > 0, \quad \beta' > 0$$

(3) *Technical Progress Function*

$$\frac{Y_{t+1} - Y_t}{Y_t} = \alpha'' + \beta'' \frac{I_t}{K_t}$$

where $$\alpha'' > 0 \qquad \text{and} \qquad 1 > \beta'' > 0$$

[1] Income is assumed to be divided into two categories, wages and profits, where the wage category comprises salaries as well as the earnings of manual labour; profits comprise not only entrepreneurial incomes but also incomes accruing to property generally.

Equation (1) shows the community's savings as consisting of a proportion α of aggregate profits (P_t) and a proportion β of wages ($Y_t - P_t$). Equation (2.1) shows that the stock of capital at time t (and which is assumed to be equal to the *desired* stock of capital at time $t-1$) is a coefficient α' of the output of the previous period (Y_{t-1}) and a coefficient β' of the rate of profit on capital of the previous period, multiplied by the output of the previous period. Equation (2.2), derived from (2.1) by difference equation, shows that investment in period t, (I_t), assumed to correspond to the difference between desired and actual capital at t, is equal to the increment in output over the previous period ($Y_t - Y_{t-1}$) multiplied by the relationship between desired capital and output in the previous period $\left(\frac{K_t}{Y_{t-1}}\right)$[1] plus a coefficient β' of the change in the rate of profit over that period, multiplied by the output of the current period. Equation (2.2) thus implies that, expressed as a proportion of the existing stock of capital, K_t, the investment of period t is equal to the expected rate of growth of turnover (which in turn is assumed to be equal to the actual rate of growth in turnover for the previous period) if the rate of profit on capital is constant; and it is greater (or smaller) than this if the rate of profit on capital is rising (or falling). Equation (3) shows the rate of growth of labour productivity (and income) as an increasing function of the rate of net investment expressed as a proportion of the stock of capital—*i.e.*, of the (proportionate) rate of growth of the capital stock.

Starting from an arbitrary point of time, $t = 1$, we can regard the existing capital stock, K_1 as a datum, a heritage of the past. We can also take as given the income Y_1 which the fully employed labour force produces with the aid of the capital equipment K_1 and the income and capital in the previous period Y_0 and K_0.[2] Assuming that the capital stock K_1 satisfies the condition

$$\frac{K_1}{Y_0} = \alpha' + \beta' \frac{P_0}{K_0} \tag{2.1.2}$$

and treating, for the moment, K_1 as well as K_0 and Y_0 as a datum, equation (2.2) can be written in the form

$$\frac{I_1}{Y_1} = \frac{Y_1 - Y_0}{Y_0} \cdot \frac{K_1}{Y_1} + \beta' \left(\frac{P_1}{K_1} - \frac{P_0}{K_0}\right) \tag{2.3}$$

$\left(\text{bearing in mind that } \frac{Y_1 - Y_0}{Y_1} \cdot \frac{K_1}{Y_0} = \frac{Y_1 - Y_0}{Y_0} \cdot \frac{K_1}{Y_1}\right)$, which means that the rate of investment in period 1, as a proportion of the income of that

[1] Since it is implicit in equation (2.1) that

$$\alpha' + \beta' \frac{P_{t-1}}{K_{t-1}} = \frac{K_t}{Y_{t-1}}$$

[2] Only three of these magnitudes are independent, since they must satisfy the technical equation (3) above with $t = 0$.

period, equals the rate of growth of income over the previous period multiplied by the capital/output ratio of the current period, plus a term depending on the change of the rate of profit over the previous period. Equation (2.3) can in turn be written in the form

$$\frac{I_1}{Y_1} = \left\{\frac{Y_1 - Y_0}{Y_0}\,\frac{K_1}{Y_1} - \beta'\,\frac{P_0}{K_0}\right\} + \beta'\,\frac{Y_1}{K_1}\cdot\frac{P_1}{Y_1} \tag{2.4}$$

while equation (1) can be written in the form

$$\frac{S_1}{Y_1} = \alpha\,\frac{P_1}{Y_1} + \beta\,\frac{Y_1 - P_1}{Y_1} = \beta + (\alpha - \beta)\,\frac{P_1}{Y_1} \tag{1.2}$$

These two equations, (1.2) and (2.4) then determine both the distribution of income (between profits and wages) and the proportion of income saved

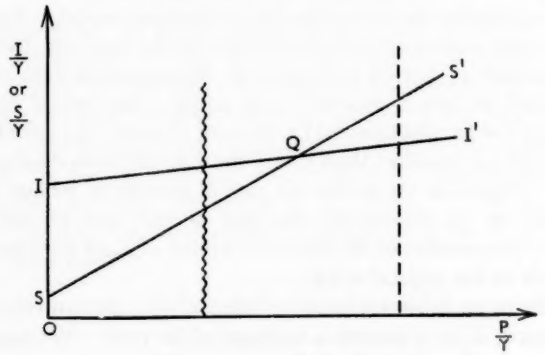

FIG. 2

and invested at $t = 1$. For the level of profits has to be such as to induce a rate of investment that is just equal to the rate of savings forthcoming at that particular distribution of income. This mechanism is illustrated in Fig. 2, where profits as a ratio of income $\left(\frac{P}{Y}\right)$ are measured horizontally and savings and investment as a ratio of income $\left(\frac{S}{Y}\text{ and }\frac{I}{Y}\right)$ vertically. The line SS' represents our equation (1.2) and II' our equation (2.4).[1] The point of intersection Q indicates the short-period equilibrium level of profits and of investment as a proportion of income. If profits are a lower proportion of income the investment plans (although lower than the equilibrium level) will tend to exceed the available savings; prices will rise in relation to costs, until the discrepancy is eliminated through the consequential rise in profits. The equilibrium will be stable if the slope of the SS'

[1] The starting point of SS' on the vertical axis represents β and its slope $\alpha-\beta$. The starting point of II' on the vertical axis depends on the proportional change in income in the previous period and on the rate of profit on capital in the previous period while the slope of II' is $\beta'\frac{Y_1}{K_1}$.

curve exceeds the slope of the II' curve, which implies, that the coefficients of the first two equations satisfy the condition

$$\alpha - \beta > \beta' \frac{Y_t}{K_t}$$

We shall assume that this is so.[1]

The working of the model is subject to two further restrictions, which were explained in an earlier article,[2] and which can be expressed as follows:

$$(4) \quad P_t \leqslant Y_t - W_{\min}$$

$$(5) \quad \frac{P_t}{Y_t} \geqslant m$$

The first of these restrictions (4) means that the profits determined by equations (1) and (2.2) should not be greater than the surplus available after the labour force has been paid a subsistence wage-bill. If this condition were not satisfied investment would be less than that indicated by equation (2.2) and would be determined by the savings available according to equation (1), when profits are equal to the surplus over subsistence wages. (In Fig. 2 the vertical dotted line represents the maximum permissible level of $\frac{P}{Y}$, and this is obtained by deducting the subsistence wage-bill from the full-employment income, determined by this condition. If the dotted line were to fall to the left of Q, as in Fig. 3, the short-period equilibrium would be represented not by Q, but by R. It will be evident that the position of the dotted line in relation to Q depends on the productivity of labour, which in turn depends in our model on the capital stock. In a progressive economy with a growing capital and output per head the dotted line will move steadily to the right, so that *sooner or later* it will pass Q and equation (2) will become operative as in Fig. 2.[3])

The second of these restrictions (equation (5)) means that the profits resulting from equations (1) and (2.2) are higher than the minimum required to secure a margin of profit over turnover below which entrepreneurs would not reduce prices, irrespective of the state of demand. (This minimum

[1] The assumption of stability in the savings–investment equilibrium under full employment has quite different implications from the corresponding assumption in a situation of under-employment equilibrium where the short-period output is regarded as variable. In the latter case the stability conditions depend on the effect of the change of income on the proportion of investment to income whereas in the former case only on the corresponding effect of a change in the *distribution* of income. In terms of our equation, a necessary (though not a sufficient) condition for short-period stability in an under-employment equilibrium—irrespective of whether equation (1) holds or not, and provided only that the marginal propensity to consume is higher than zero—is that $K_t < Y_t$ (*i.e.*, the accelerator coefficient in the first term of our second equation is less than unity). In a full-employment model the stability of our equilibrium is not dependent at all on the accelerator coefficient, but only on the change of that coefficient induced by a change in the rate of profit associated with a change in the distribution of income.

[2] Cf. "Alternative Theories of Distribution," *op. cit.*, pp. 97–8.
Cf. also pp. 618–21 below.

margin of profit is that corresponding to the " degree of monopoly," or the traditional profit margin required to cover full costs, etc.) If this condition were not satisfied, full-employment savings indicated by equation (1) would exceed investment (since prices and profits would not fall sufficiently to secure the equality of savings and investment), so that income and employment would be reduced *below* the full-employment level to the point where

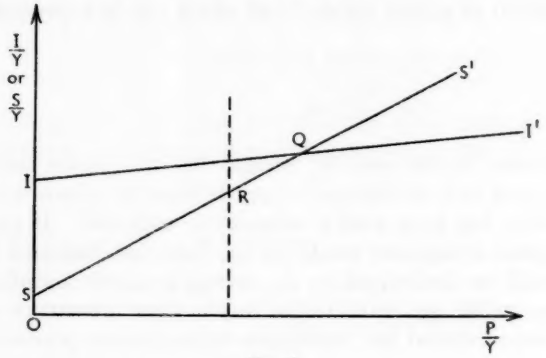

FIG. 3

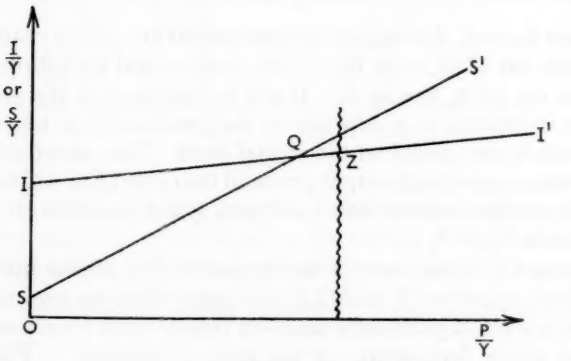

FIG. 4

the savings generated by that income are no more than sufficient to finance investment. (In Fig. 2 the waved line represents this minimum level of profits. If this minimum were to fall to the right of Q equilibrium would not be at Q, but at Z, as shown in Fig. 4, while income will fall below Y_0 to the point where the savings–income ratio is reduced to the level indicated by Z.)

Our model thus supposes: (i) that the wages $(Y_0 - P_0)$ resulting from equations (1) and (2.2) are higher than the minimum, set by the supply-price of labour; (ii) that the profits resulting from these same equations are higher than the minimum required to satisfy entrepreneurs. The absence of the first condition leads to the Marxian type of model, where profits are deter-

mined by the surplus over subsistence wages, and investment is governed by the size of that surplus; the absence of the second condition leads to a Keynesian model of under-employment equilibrium, which, as was indicated above,[1] is inconsistent with the long-run equilibrium of a growing economy. Our model thus relates to a capitalist economy which is sufficiently highly developed for wages to be above subsistence level and sufficiently competitive at the same time to generate adequate demand to secure full employment.

Assuming these conditions are satisfied, our technical progress function (equation (3) above) indicates the growth of income and capital from $t = 1$ onwards, and the gradual movement of the economy from a short-period equilibrium to a long-period equilibrium of steady growth. This is illustrated in Fig. 5, where the proportionate growth of capital is measured

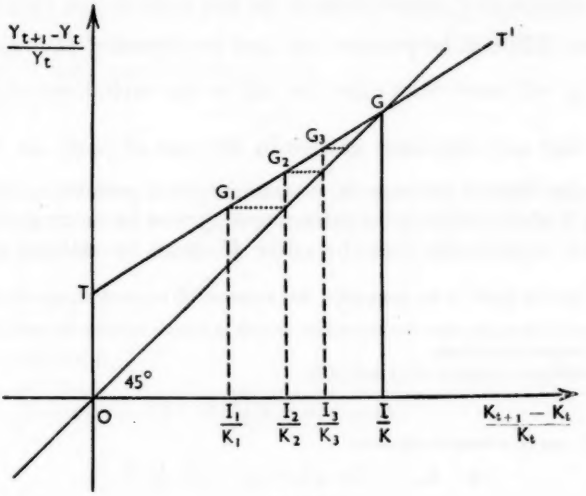

FIG. 5

horizontally and the proportionate growth of income vertically.[2] Suppose that the initial rate of investment, as determined by equations (1) and (2.3), at $t = 1$, $\frac{I_1}{K_1}$ is to the left of $\frac{I}{K}$. This implies that the growth of output, g, in successive units of time will be greater than the growth of capital, $\frac{I_1}{K_1}$,[3] and, in accordance with our equation (2.3), and apart from any changes in the rate of profit on capital, the rate of investment will be stepped up in the

[1] Cf. p. 594 above.

[2] Fig. 5 is identical with Fig. 1 except that in accordance with equation (3), the technical progress function TT' is here represented by a straight line.

[3] We shall denote g_1, g_2, etc., the rates of growth in income corresponding to the points G_1, G_2, etc., in the diagram.

subsequent period so as to make $\frac{I_2}{K_2}$ equal to g_1, which in turn will raise the growth in income in the second period to g_2. By similar reasoning, the growth of output in the third period will rise to g_3 and so on, until G is reached, at which the rates of growth of income and capital are equal.

The indirect effects through changes in the rates of profit on capital will reinforce this process. For since $\frac{Y_t}{K_t}$ is increasing so long as G_t is to the left of G, $\frac{P_t}{K_t}$ will be increasing so long as $\frac{P_t}{Y_t}$ is not decreasing; while, in accordance with equation (1), $\frac{P_t}{Y_t}$ will be non-decreasing provided $\frac{I_t}{Y_t}$ is not decreasing. The change in $\frac{I_t}{Y_t}$ attributable to the first term of (the right-hand side of) equation (2.2) will be positive with any movement of G_t towards G, for the rise in g_t will more than offset the fall in the capital/output ratio, $\frac{K_t}{Y_t}$. It follows that any associated change in the rate of profit on capital $\frac{P_t}{K_t}$ will make the rate of increase in investment even greater. (This means that in Fig. 2 above the point of intersection Q must be moving towards the right, which implies also that the curve II' must be shifting upwards.[1])

[1] A more rigorous proof of the proposition that equation (2) represents a curve in the $\left(\frac{I_t}{Y_t}, \frac{P_t}{Y_t}\right)$ plane which moves upwards when the percentage growth in income exceeds the percentage growth in capital can be given as follows.

Since, according to equation (2.1) and (2.2)

$$K_{t+1} = \left\{\alpha' + \beta' \frac{P_t}{K_t}\right\} Y_t$$

Equation (2.2) can be written in the form

$$I_t = K_{t+1} - K_t = \alpha' Y_t - K_t + Y_t \left\{\beta' \frac{Y_t}{K_t}\right\} \frac{P}{Y}$$

hence

$$\frac{I_t}{Y_t} = \left\{\alpha' - \frac{K_t}{Y_t}\right\} + \left\{\beta' \frac{Y_t}{K_t}\right\} \frac{P_t}{Y_t}$$

This curve must evidently shift upwards with any increase in $\frac{Y_t}{K_t}$, for any fixed value of $\frac{P_t}{Y_t}$.

On the other hand, if instead of equation (2.2) we had chosen an investment function of the form

$$\frac{I_t}{K_t} = \alpha' + \beta' \frac{P_t}{K_t} \quad (\text{where } \alpha' > 0),$$

which makes the proportionate rate of growth of capital depend simply on the rate of profit on capital and without regard to the rate of change of income, the relationship of investment to income will be

$$\frac{I_t}{Y_t} = \alpha' \frac{K_t}{Y_t} + \beta' \frac{P_t}{Y_t}$$

In that case if $\frac{\Delta Y_t}{Y_t} > \frac{I_t}{K_t}$, so that $\frac{K_t}{Y_t}$ is falling, this curve $\frac{I_t}{Y_t}$ in the $\left(\frac{I_t}{Y_t}, \frac{P_t}{Y_t}\right)$ plane will be falling. An investment function of this form therefore, whilst it satisfies the conditions of stability of short-period equilibrium, makes the position of long-period equilibrium at G unstable, since the point G in Fig. 5 would be moving away from instead of towards G.

An exactly similar proof could be adduced to show that if G_t were to lie to the right of G, then it must be moving to the left towards G. Long-run equilibrium must therefore be at G, where the rates of growth of income and capital are equal.

It follows from our equations that the long-run equilibrium rate of growth of income and capital is independent of the value of the coefficients of equations (1) and (2.3) (the savings and investment functions), and depends only on the coefficients in equation (3), the technical progress function. It is given by

$$G = \frac{\alpha''}{1 - \beta''} \tag{6}$$

which is the equilibrium rate of growth in productivity, *i.e.*, that particular rate of growth of productivity which makes the (percentage) rates of growth of capital and income equal, and which (under the hypothesis of a constant population) is itself equal to them both.

Putting

$$\frac{\alpha''}{1 - \beta''} = \gamma'',$$

the equilibrium ratio of investment to income, the equilibrium share of profits to income and the equilibrium rate of profit on capital can all be derived with the aid of equations (1) and (2.3) as follows:

$$\frac{I}{Y} = \gamma'' \frac{K}{Y} \tag{7.1}$$

Since from equation (1.2)

$$\frac{S}{Y} = \alpha \frac{P}{Y} + \beta \left(1 - \frac{P}{Y}\right)$$

$$\therefore \quad \frac{P}{Y} = \frac{\gamma'' \frac{K}{Y} - \beta}{\alpha - \beta} \tag{8.1}$$

$$\frac{P}{K} = \frac{\gamma'' - \beta \frac{Y}{K}}{\alpha - \beta} \tag{9.1}$$

The family resemblance between our set of equations and the Harrod–Domar formula will be evident. Equation (7.1), together with equation (1.2), is a variant of Mr. Harrod's " warranted rate of growth," with the important differences: (i) that the assumption of given savings propensities (for profit-receivers and wage-earners) does not define a unique warranted rate, but is consistent with any number of warranted rates, depending on the distribution of income, which determines the average propensity to save for the community as a whole, the latter in turn being dependent on the ratio of investment to income; (ii) the rate of growth of the system is not determined

by the savings function, but by equation (6), which is, in effect, a variant of Mr. Harrod's " natural rate " (under the hypothesis of a constant population) except that the rate of increase in productivity due to technical progress is not treated as a constant here, but as a variable, and our γ'' is that particular rate of increase of productivity which makes the latter equal to the rate of increase in capital per head. In fact, the implications of our model in terms of Mr. Harrod's terminology could be summed up by saying that the system tends towards an equilibrium rate of growth at which the " natural " and the " warranted " rates are equal, since any divergence between the two will set up forces tending to eliminate the difference; and these forces act partly through an adjustment of the " natural " rate, and partly through an adjustment of the " warranted " rate.

So far the expression $\frac{K}{Y}$, though an outcome of the equilibrating process, has not been eliminated from our formulæ. To do so, we must return to our desired capital function (2.1), which, owing to the substitution introduced in (2.1.2), has not so far been made use of. Dividing (2.1) with Y_t, we obtain

$$\frac{K_t}{Y_t} = \alpha' \frac{Y_{t-1}}{Y_t} + \beta' \left(\frac{P_{t-1}}{K_{t-1}}\right) \frac{Y_{t-1}}{Y_t} \tag{2.1.3}$$

Bearing in mind that in long-period equilibrium

$$\frac{P_{t-1}}{K_{t-1}} = \frac{P_t}{K_t} = \frac{P}{K}, \quad \text{and} \quad \frac{Y_{t-1}}{Y_t} = \frac{1}{1+\gamma''}$$

and putting

$$\frac{K_t}{Y_t} = \frac{K}{Y} = x$$

we obtain the expression

$$x = \frac{1}{1+\gamma''}\left(\alpha' + \beta' \frac{P}{K}\right) \tag{2.1.4}$$

Further, since in long run equilibrium

$$\frac{S_t}{K_t} = \frac{S}{K} = \gamma''$$

equation (1.2), divided by K_t, can be written in the form

$$\gamma'' = \frac{\beta}{x} + (\alpha - \beta)\frac{P}{K} \tag{1.3}$$

Hence

$$\frac{P}{K} = \frac{1}{\alpha - \beta}\left\{\gamma'' - \frac{\beta}{x}\right\}$$

and

$$x = \frac{1}{1+\gamma''}\left\{\alpha' + \frac{\beta'}{\alpha - \beta}\left(\gamma'' - \frac{\beta}{x}\right)\right\}$$

which can be re-written in the form

$$(\alpha - \beta)(1 + \gamma'')x^2 = \{(\alpha - \beta)\alpha' + \beta'\gamma''\}x - \beta\beta'$$

Hence

$$Ax^2 - Bx + C = 0 \tag{10.1}$$

where $A = (\alpha - \beta)(1 + \gamma'')$, $B = (\alpha - \beta)\alpha' + \beta'\gamma''$, and $C = \beta\beta'$

Thus the derivation of the capital/output ratio, $\frac{K}{Y}$, involves a quadratic equation which has two positive roots in $\frac{K}{Y}$, of which normally the greater of the two only would be relevant.[1]

The complication of quadratic solutions is avoided, however (and the formulæ greatly simplified), if we assumed that all savings come out of profits, so that $\beta = 0$. (Since β is in any case likely to be small, the difference introduced by this cannot quantitatively be very significant.) In that case the equilibrium value of the capital/output ratio, derived from (2.1.4) and (1.3), is given by the expression

$$\frac{K}{Y} = \frac{\alpha\alpha' + \beta'\gamma''}{\alpha(1 + \gamma'')} \tag{10.2}$$

while the equilibrium values of the other variables reduce to the formulæ

$$\frac{I}{Y} = \frac{\alpha\alpha'\gamma'' + \beta'(\gamma'')^2}{\alpha(1 + \gamma'')} \tag{7.2}$$

$$\frac{P}{Y} = \frac{\alpha\alpha'\gamma'' + \beta'(\gamma'')^2}{(\alpha)^2(1 + \gamma'')} \tag{8.2}$$

$$\frac{P}{K} = \frac{\gamma''}{\alpha} \tag{9.2}$$

It is interesting to note that the rate of profit on capital depends on the rate of growth, γ'' (and thus ultimately on the coefficients of the technical progress function, α'', and β'' which determine this rate), and on the savings coefficients of profits, α. On the other hand, the investment coefficient and the share of profits in income, just as the capital/output ratio, depend on the coefficients of the investment function, α' and β', as well as on α and α'' and β''.

The result shown by equation (9.2) that the rate of return on capital depends only on the rate of economic growth and the division of capitalists' income between consumption and saving, and is independent of everything else (such as the factors determining the share of profits in income and the capital/output ratio) may sound highly paradoxical at first. Yet a little reflection shows that it must evidently be correct. For if the income accruing to capital were all devoted to accumulation (when that income is

[1] Since on any reasonable values o the coefficients, the larger root will be greater than unity and the smaller root less than unity when Y is thought of as annual income, and $\frac{K}{Y}$ is likely to be appreciably larger than 1. (The same holds, of course, with appropriate adjustments in the values of the coefficients, when Y is thought of in terms of some different period.)

the sole source of savings) the rate of profit on capital would evidently be identical with the rate of growth of the capital stock; if capital and output grow at the same rate this rate must be identical with the rate of growth of the economy. If the owners of capital do not save all their income but consume part of it (but profits remain the only source of savings) the rate of profit must exceed the rate of accumulation by the ratio of capitalists' consumption to savings.[1]

(b) *Expanding Population*

According to the Malthusian theory, the rate of population increase is a function of the rate of increase of the " means of subsistence " (which we can assume to be equivalent to the rate of increase in total production.) This doctrine is clearly subject to certain limitations. For any given fertility rate (or gross reproduction rate) in a community the percentage rate of growth in population cannot exceed a certain maximum, however fast real income is rising; and it may be supposed that the rate of population growth will rise only moderately as a function of the rate of growth in income over some interval of the latter before that maximum is reached. The dependence of population growth on the growth of income is best represented therefore in the terms of a curve which is convex upwards, as in Fig. 6 (measuring the proportionate rate of growth of population vertically and that of income horizontally) and whose slope nearly equals unity when the rate of growth of income is relatively low, and which becomes virtually horizontal when the rate of growth of income exceeds a certain critical value.[2] In terms of a linear equation, this relationship can be approximated by two straight lines indicated by the dotted lines in Fig. 6, which can be algebraically expressed as follows. Writing l_t, g_t for the (percentage) rates of growth of population and income, and λ for the maximum rate of growth of population,

$$(11) \qquad \begin{aligned} l_t &= g_t \ (g_t \leqslant \lambda) \\ l_t &= \lambda \ (g_t > \lambda). \end{aligned}$$

[1] As (9.1) shows, when profits are not the sole source of savings, the rate of return on capital will also depend on wage-earners' savings, though in no simple fashion, since β (the proportion of wages saved) appears both in the numerator and the denominator of the expression. It follows, however, from (8.1) that $\gamma'' < \alpha \frac{\gamma}{K}$ when $\frac{P}{Y} < 1$, hence a rise in β must lower the rate of profit on capital (and the share of profits in income). This is the basis of the (seemingly paradoxical) assertion that whereas the capitalists (as a group) can raise their share in the national income by spending *more*, wage-earners as a group can increase their share only by spending *less*.

[2] The maximum rate of population growth is partly a matter of fertility rates (*i.e.*, the gross reproduction rate) and partly of medical knowledge which determines the rate of survival (in particular, the infant-mortality rates) at a given standard of living. The fall in fertility rates in the advanced countries during the last half-century or more lowered the position of their Malthusian population curves considerably. On the other hand, there is a good deal of evidence tending to suggest that the considerable acceleration in the rates of population growth of the under-developed areas which occurred in the last half-century or so was due, in the main, not to an acceleration in the rate of growth of income but to a rise in the survival rate (due to the medical improvements which reduced the incidence of epidemics, etc.) and was attended in some cases by an appreciable fall in the standard of living of the population.

Assuming to start with that the rate of population growth is λ (*i.e.*, $g_t > \lambda$), $\frac{I_t}{K_t}$ in equation (3) is replaced by $\frac{I_t}{K_t} - \lambda$, and $\frac{Y_{t+1} - Y_t}{Y_t}$ by $\left(\frac{Y_{t+1} - Y_t}{Y} - \lambda\right)$. Hence the long-run equilibrium rate of growth of both capital and income becomes

$$G = \gamma'' + \lambda \tag{6.2}$$

The long-run equilibrium values of other ratios are then obtained by substituting $(\gamma'' + \lambda)$ for γ'' in equations (7)–(10).

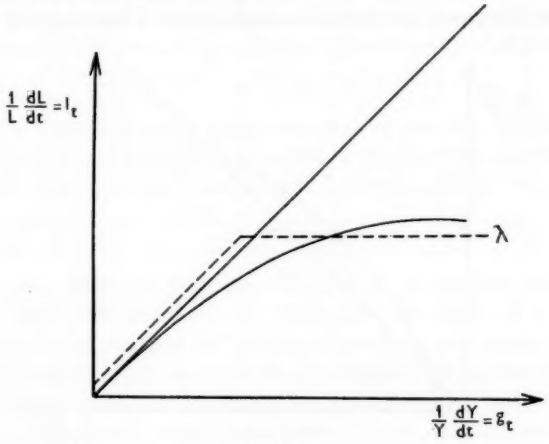

FIG. 6

If to start with, $g_t < \lambda$ (and hence $l_t < \lambda$) the rates of growth of income and population will continually accelerate until the latter approaches λ. In long-run equilibrium population must therefore grow at its maximum rate—*i.e.*, at that indicated by the horizontal section of the curve in Fig. 6.

The above assumes that the shape and position of the technical progress function—*i.e.*, the coefficients α'' and β'' in equation (3) above, and hence γ''—remain unaffected by population changes. This implies in economic terms that there are constant returns to scale to equi-proportionate increases in labour and capital; in other words, that an increase in numbers, given the amount of capital per head, leaves output per head unaffected. This assumption may be valid enough in the case of a young and relatively under-populated country [1]; in the case of over-populated countries, however, the

[1] In general, the density of population in any given area will in itself be conditioned by the availability of natural resources, which means that the density will normally be sufficiently great for the stage of diminishing returns to have been reached. When, however, a new population possessing radically different techniques invades a territory (as in the case of the white settlers in America and other areas in the New World) the point of optimum density, corresponding to the new techniques, may be so radically different that there may occur a manifold increase in population density without encountering diminishing returns.

scarcity of land will cause diminishing returns, which means that, with given techniques and capital per head, an increase in numbers will cause a fall in productivity.[1] Given the rate of the flow of new ideas, the curve denoting our technical progress function will be lowered by an extent depending on the rate of increase in population. It is then possible that instead of the curve intersecting the income-axis in the positive quadrant, as shown in Fig. 1 above, it will cut the capital-axis positively, as in Fig. 7 [2]—which means that it will require a certain percentage growth in capital per head (C_t) even to maintain output per head (O_t) at a constant level. It will be evident that the maintenance of an equilibrium of growth is much more precarious in this case; instead of a single point of intersection of the curve

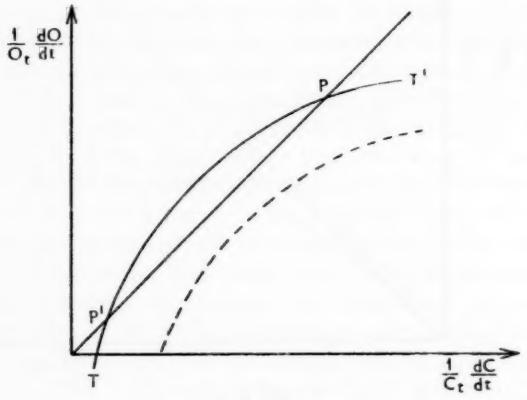

FIG. 7

with the diagonal line, we have two points of intersection, P' and P, of which only the latter is stable, while the former is unstable; if the economy happens to be in a position (or come to a position) which is to the left of P' the rate of growth of income and capital will steadily diminish until—after an intervening period of falling output per head—the growth of capital and income come to a complete standstill. It is even possible in this case that the position of

[1] It is assumed here that diminishing returns due to the scarcity of land are attendant upon an increase in the working population, rather than an increase in the volume of production as such. It is possible, of course, that the scarcity of natural resources would put increasing obstacles to the expansion of output, even when population is constant—in which case, given the rate of invention and innovation, the growth of productivity at any given rate of investment will be slowed down, and our TT' curve will gradually shift downwards over successive periods. Since, however, diminishing returns due to the scarcity of land are peculiarly associated with food supplies, while food requirements vary with the size of the population far more than with income per head, it is more appropriate to treat the problem of diminishing returns in the classical manner and associate it with the "widening" of capital due to an increase in numbers, rather than as restricting the scope of increasing productivity through "deepening."

[2] Since the assumption of a linear function is no longer adequate in this case for exhibiting the various possibilities inherent in the situation, we return to the non-linear mode of representation which was originally employed in Fig. 1.

the TT' curve should be below the diagonal throughout its length (as in the dotted line in Fig. 7), in which case no long-period equilibrium is attainable short of complete stagnation.

Whether an expanding population will be consistent with an equilibrium of growth or not will thus primarily depend on the relative magnitude of two factors: (i) the maximum rate of population increase λ, and (ii) the rate of technical progress, which causes a certain percentage increase in productivity, α'' in equation (3) above, when both population and capital per head are held constant. Since diminishing returns cannot cause the output of a larger working population to be smaller than that of a smaller population, the growth of population cannot lower the position of the TT' curve by more than the rate of population growth itself, so that *if*

$$\alpha'' > \lambda$$

the technical progress function must continue to cut the vertical (income) axis positively, and the possibility of a stable equilibrium of growth will be assured. The long-run equilibrium rate of growth will still be given by the formula

$$G = \gamma'' + \lambda \tag{6.2}$$

bearing in mind, however, that the value of γ'' is not here independently given, but is itself influenced by λ.[1] But when the value of λ is relatively large, and the forces making for technical progress are weak, the formula (6.2) may no longer apply because of the inability of income to grow at a steady rate of λ or above. For example, if we suppose that, as a result of diminishing returns and rapid population growth (made possible by the high value of λ), α'' in equation (3) became negative—which implies that in Fig. 5 the point of intersection G with the diagonal had moved down into the negative quadrant, making γ'' negative—the growth of population would exceed the growth of production when the population grew at the rate λ. In this situation an equilibrium rate of growth is conceivable only when population and income grow at the same rate, and this can be attained only at that particular rate of population growth (lower than λ) which makes γ'' equal to zero. Thus, if we denote by $L(\gamma)$ the rate of population growth which causes γ'' to take the value γ, then in place of equation (6.2) we have

$$\begin{aligned} & l_t \longrightarrow L(o) \\ & g_t \longrightarrow l_t \\ \therefore \quad & g_t \longrightarrow L(o) \end{aligned} \tag{12}$$

[1] The available data for the more advanced capitalist economies over the last century suggest that the value of γ'' varied between 2 and 4% per annum, for the different countries, which is consistent with a value of β'' of, say, 0·5, and for α'' of 0·01–0·02 or 1–2%. According to Professor Kuznets' investigations (cf. "The Quantitative Aspects of the Economic Growth of Nations," *Economic Development and Cultural Change*, Vol. V, No. 1, October 1956, p. 42), the value of γ'' in the more advanced economies remained relatively unaffected by changes in the rate of population growth. In the under-developed areas, according to the evidence of the same source, the value of γ'' must have been very much lower.

In other words, for economies which are capable of only slow technical progress, and whose potential rate of population growth is relatively large, and which are subject to diminishing returns, the long-run equilibrium rate of growth and income (and capital) is determined by a different set of conditions. It has to be that rate of population growth which allows output per head and capital per head to remain constant over time. (Income and capital per head must be low enough to restrict the rate of population growth to that rate; and the higher the degree of medical knowledge which determines infant mortality, the lower this constant level of income per head will have to be.) This again is a stable position, since there is only one particular rate of population growth which enables the rate of growth of income to be equal to it; at any lesser rate productivity per head will rise, and the growth of income will exceed the growth of population (causing the latter to increase and income per head to cease rising); at any higher rate, productivity will fall and the growth of income will fall short of the growth in population (causing the latter to contract and income per head to cease falling). Long-run growth with a rising standard of living necessarily presupposes that there is some check to the rate of population growth which operates before it reaches the maximum attainable rate of growth of the national income.

The Two Stages of Capitalism

The historical emergence of capitalist enterprise involved a tremendous increase in the " technical dynamism " of the economic system. The most important characteristic of capitalist business enterprise is the continuous change and improvement in the methods of production, as against the relatively unchanging techniques of peasant cultivation and artisan production. In terms of our model, the growth of the capitalist sector in the economy involved a dramatic rise in technical progress function, and hence in the equilibrium rate of growth of productivity, γ''—the increase in savings, investments, both as a proportion of income and of capital, and the great acceleration in the rates of population growth, were consequences of this, and not its initiating causes.[1]

[1] In the same way the important differences in long-period growth rates between different capitalist economies—which manifested themselves, *e.g.*, in the fivefold increase in income per head in the United States in the last 100 years as against a near threefold increase in Britain over the same period—can only be ascribed to the various social factors which cause differences in the degree of " technical dynamism "—in the speed of adaptation to new techniques—rather than to differences in savings propensities, in national environment, etc. Again, the causes of the relatively low rates of progress in the under-developed areas of the world are mainly to be sought in the social and institutional factors which impeded the spread of " technical dynamism," particularly in the agricultural field, and thereby inhibited progress in those sectors of the economy also in which capitalist enterprise could establish itself and where the sociological obstacles to continued technical change were removed. Thus the absence of a progressive agriculture has been the most important factor inhibiting industrialisation in the under-developed areas. (This latter problem is treated in more detail in another paper by the author, " Characteristics of Economic Development," published in *Atti del Congresso Internazionale di Studio sul Problema delle Area Arretrate* (Milan: Giuffre 1955).)

In the early stage of capitalist development the growth in productivity was not attended by a rise in the standard of living of the working classes. The stationary trend in real wages in Britain despite considerable improvement in production per head during the first half of the nineteenth century was the feature of capitalist evolution which so strongly impressed Marx and forms one of the main themes of Volume I of *Das Kapital*. The same has been true of other capitalist countries: in the case of Japan, for instance, real wages increased very little between 1878 and 1917, despite a one-and-a-half-fold increase in real income per head over the period.[1]

This suggests that in the first stage of capitalist evolution, productivity, though rising, is not large enough to allow for a surplus over the subsistence wage which permits the rate of investment to attain the level indicated by equation (2.2); in other words the profits which would result from equations (1) and (2.2) are inconsistent with the restriction indicated by equation (4).

Since equation (2.2) will be replaced by

$$P_t = Y_t - W_{\min.} \tag{4a}$$

this combined with (1) yields

$$S_t = (\alpha - \beta)\, P_t + \beta Y_t$$

so that

$$S_t = I_t = \alpha Y_t - (\alpha - \beta)\, W_{\min.} \tag{13}$$

So long as (13) holds $\frac{I_t}{Y_t}$ will be steadily rising with the increase in the productivity of labour so that if, initially, $\frac{Y_t}{K_t}$ is rising (*i.e.*, the situation is to the left of G in Fig. 5) $\frac{I_t}{K_t}$ will be rising also. This movement will not be brought to a halt by approaching G, for while the (current) rate of growth of capital will approach the (current) rate of growth of income (as the rate of investment approaches that corresponding to G), there will be a backlog of investment from previous periods due to the growing divergence between actual capital and desired capital (since the rate of investment at each period was *ex hypothesi* insufficient to bring actual capital into line with desired capital). Hence the increase in the rate of capital accumulation will pass the point G, and the economy will settle down to a steady decrease of $\frac{Y_t}{K_t}$. In this first stage of capitalism therefore the capital/output ratio (at any rate after some initial period) will show a steady increase, in accordance with both the Marxian and the neo-classical models. Since, however, the share of profit in income will also increase continuously, the rise in the

[1] Cf. Mataji Umemura. "Real Wages of Industrial Workers" in the volume *An Analysis of the Japanese Economy*, edited by S. Tsuru and K. Ohkava (Tokyo, 1953). In the period 1918–42, on the other hand, the rise in real wages fully kept pace with the growth in output per head.

capital/output ratio will not necessarily imply a falling rate of profit on capital, and may be consistent with a rising rate.

This first stage of capitalism, however, must sooner or later be brought to an end when the capital stock attains the level of " desired capital," indicated by equation (2.1). From that point onwards the rate of investment will no longer be governed by equation (13), but by equation (2.2) and the reaction-mechanism of the system becomes a totally different one. Profits are no longer determined in the Marxian manner, as the surplus of production over subsistence wages; on the contrary, the share of wages becomes a residual, equalling the difference between production and the share of profits as determined in a " Keynesian " manner, by the propensities

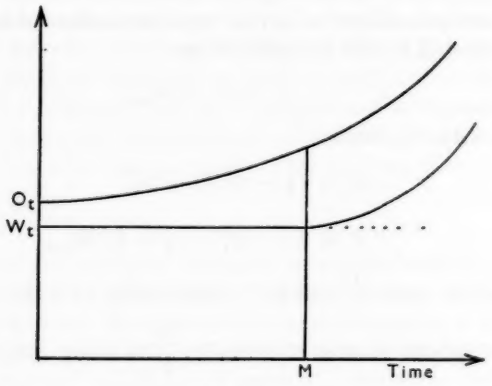

FIG. 8

to invest and to save. From then onwards, and assuming that the parameters in our equations (1)–(3) remain constant, real wages will rise automatically at the same rate as the productivity of labour, so that distributive shares remain constant through time; and since the system will tend to settle down to an equilibrium where the rate of growth of capital is equal to the rate of growth in income, the capital/output ratio, and the rate of profit in capital, will also tend to remain constant over time.

The process of changing-over from Stage I to Stage II is illustrated in Fig. 8 (measuring time horizontally, and productivity, O_t, and wages, W_t, vertically). The dividing line M is at the point of time when the stock of capital attains the " desired " level, indicated by equation (2.1) and the share of profits ($O_t - W_t$) yields savings that are sufficient to finance a rate of investment corresponding to equation (2.2). Once this stage is reached, any further increase in the " surplus " will not be fully absorbed in increasing investment and/or capitalist consumption; a growing share of the increase

in the " surplus " will accrue to labour automatically, through the constellation of prices in relation to wages.

This second and more cheerful stage of capitalism in which production and employment continue to grow, and real wages are steadily rising with the growth in production, was quite unforeseen by Marx. Marxist economists would probably argue that its emergence is prevented by the growth of " monopoly-capitalism," for not only the productivity of labour, but also the degree of concentration of production can be expected to rise steadily with the progress of capitalism. This causes a steady weakening of the forces of competition, as a result of which the share of profit would go on rising beyond the point where it covers investment needs and the consumption of capitalists. Hence, on this argument, by the time the restriction implied in equation (4) is lifted the restriction implied by equation (5) should become operative, and that means that the system will cease to be capable of generating sufficient purchasing power to keep the mechanism of growth in operation.

The plain answer to this is that so far, at any rate, this has not happened. Though the growing concentration of production in the hands of giant firms proceeded in much the same way as Marx predicted, this was not attended by a corresponding growth in the share of profits.[1] On the contrary, all statistical indications suggest that the share of profits in income in leading capitalist economies such as the United States have shown a falling rather than a rising trend over recent decades, and is appreciably below the level of the late nineteenth century; and despite the extraordinary severity and duration of the depression of the 1930s, the problem of " realising surplus value " appears no more chronic to-day than it was in Marx's day.

Trend and Fluctuations

Our model is intended to be a " long-run " model—*i.e.*, a model exhibiting long-run tendencies operating in the economy—and as such it deliberately rules out all kinds of complicating features of the real world which have to be taken into account before the methods of reasoning and the conclusions can be applied to actual situations. In this paper we can do no more than indicate briefly some of these limitations and the influence they are likely to exert, particularly during shorter periods.

(1) One of these is that the theory of distribution underlying this model —which makes the share of profits in income entirely dependent on the ratio of investment to output, and the propensity to save out of profits and wages

[1] Moreover—and this is more significant—empirical investigations concerning the ratio of profit to turnover in different industries do not lend any support to the hypothesis that the differences in profit margins are to be explained by differences in the degree of concentration of production. Typically monopolistic industries, where output is largely controlled by a few firms, have in many cases lower profit margins than industries where the degree of concentration is small.

—is only acceptable as a " long-run " theory, since changes in these factors exert only a limited influence in the short period. As was indicated in my earlier paper,[1] in the short period profit margins are likely to be inflexible, in both an upward and a downward direction, around their customary level —which means that they are largely historically determined. What is suggested here is that long-term investment requirements and saving propensities are the underlying factors which set the standard around which these customary levels are formed, and which are responsible for the gradual change of these levels in any particular economy, or for differences as between different economies. This means that in the short period: (i) when investment falls significantly *below* some " normal " level, profit margins will not fall sufficiently to set up a compensating increase in consumption; instead, total income and employment will be reduced, in accordance with the Keynesian multiplier theory; (ii) when investment demand rises significantly *above* some " normal " level profit margins will not rise sufficiently to allow a corresponding increase in real investment; instead, some kind of investment rationing will take place by the lengthening of order books, and/or a tight credit policy, etc., or simply by the rise in the prices of investment goods in relation to consumption goods.[2] The short-period rigidity of profit margins, due to entrepreneurial behaviour, will be reinforced also by another factor: the downward inflexibility of real wages around their customary or attained level. Though over a longer period the *share* of wages is flexible in both an upward and downward direction through *real* wages rising more or less than in proportion to the rise in productivity, in the short period an *absolute* cut in real wages is likely to entail a severe inflationary wage–price spiral; and hence an increase in investment which would entail such a cut is likely to be prevented, if by nothing else, by measures of monetary policy. The speed with which an increase in the proportion of current production devoted to investment can be brought about will therefore be limited by the rate of increase in productivity, as well as by other factors, such as the limited capacity of investment-goods industries.

(2) A second important qualification relates to the hypothesis of a constant flow of invention and innovation over time, which underlies our assumption of a technical-progress function with constant parameters. To the extent that technical progress consists of a great multitude of minor changes and improvements, one may rely on the operation of the law of large numbers

[1] Cf. " Alternative Theories of Distribution," *loc. cit.*, pp. 99–100.

[2] This is in any case part of the mechanism through which a rise in investment demand will cause in the long run a rise in the proportion of resources devoted to investment and a corresponding fall in the proportion devoted to consumption. In the short period, investment in real terms is limited by the capacity of the investment-goods industries; a rise in the demand for investment goods must therefore raise first their relative prices, and thereby the relative profitability of investment in these industries; this in turn will entail a gradual rise in the capacity of these industries, relatively to the capacity of the consumption-goods industries.

to ensure that the rate at which improvements are invented and introduced in the economy as a whole remains fairly steady. But in addition there are major innovations due to the discovery of basic new principles; these occur at irregular intervals, and their exploitation opens up vast new avenues of profitable investment. The effects of such major discoveries (such as the invention of electricity, the internal-combustion engine, etc.) are superimposed on the "normal" rate of progress due to minor improvements, and their effect is to raise the TT' curve above its "normal" level during the period of their initial exploitation (which may be spread over several decades). Hence we can expect periods of rising and falling technical progress: periods in which the growth of production and real income runs ahead of the growth of capital, to be followed by other periods when capital investment catches up and the stock of capital increases faster than income.

The effect of the short-period rigidities of profit margins referred to in the earlier paragraph is to slow down the rate at which capital investment is rising in response to an upward shift of the TT' curve; and also to slow down the rate at which actual investment is falling in response to a downward shift of the TT' curve. To a certain extent, therefore, these short-period rigidities act as a stabiliser on the economy; they make it capable of absorbing the shocks created by the unequal incidence of new discoveries without major unheavals—merely by varying the rates at which income and capital are growing.[1] However, these same short-period rigidities may cause "over-saving" (owing to the failure of income distribution to adjust itself promptly enough to the fall in investment) and thus bring about a major breakdown in the process of investment and economic growth, such as occurred during the great depressions of the 1880s or the 1930s. For when rising capital/output ratios and falling profit rates cause the rate of investment to shrink at some critical speed (or below some critical level) the fall in income generated in the investment-goods industries will react unfavourably on the level of demand in the consumption-goods industries, causing a cumulative process of contraction in incomes, investment and employment.

The mechanics of our model are thus consistent both with minor fluctuations in growth rates and with major breakdowns in the process of growth, involving heavy unemployment and temporary stagnation. If the latter occurs, net investment might even become negative, so that eventual revival will be facilitated by the gradual erosion of capital as well as by the rise in

[1] On the basis of our model, we should expect an acceleration of the rate of growth of income to be followed by an acceleration in the rate of growth of capital, so that relatively fast and relatively slow rates of growth of income and capital are correlated but the movements in the latter are more sluggish than those in the former. Hence periods of accelerating growth are likely to be periods in which the capital/output ratio is falling, and periods of decelerating growth are those in which the capital/output ratio is rising. Owing to the short-period rigidities, etc., mentioned, there may, moreover, be a rising backlog of investments during periods of accelerating growth which might cause the rate of investment to continue to accelerate for some time after the rate of growth in income had begun to slow down.

the TT' function due to the cumulative effect of unexploited new inventions. The system is liable to such major breakdowns in the wake of exploitation of major discoveries when the economy geared to a higher rate of progress needs to be " switched back " to a more moderate rate of growth; and they should be heralded by a period during which the growth in income lags behind the growth in capital, and the capital/output ratio is rising. But on the assumptions of the model presented here the occurrence of such major breakdowns is neither regular nor inevitable—the most that one can say is that the same forces that are capable of maintaining continued growth at full employment when the underlying factors making for technical change are reasonably stable are liable to break down in their operation when, as a result of instability of these factors, the situation demands a slowdown in the growth of income and capital.

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MONEY, PRICES AND THE THEORY OF INTEREST DETERMINATION[1]

I. Introduction

The Keynesian-classical debate produced substantial agreement on the comparative statics of interest theory. Saving and investment, the classical determinants of interest, were joined with the supply and demand for money —the Keynesian variables—in a general system in which either pair of schedules could determine the long-run rate of interest. Under conditions of full employment, price flexibility and linear homogeneous spending functions, saving and investment are fixed. They determine a natural rate of interest to which the liquidity market must conform. But the liquidity market plays a more strategic role in fixing the interest rate if resources are unemployed. The demand for money determines the quantity of money available for spending, which, in turn, generates real income, the level of saving and the rate of interest.[2]

There is much less unanimity, however, on the dynamics of interest determination. Indeed, there are at least three widely held views of the mechanism by which movements in the market rate of interest occur. The neo-Keynesian[3] typically argues that in the time interval relevant for dynamic analysis the large stock of existing assets swamps increments to the

[1] I would like to express my gratitude to Sir Dennis Robertson, Phillip Cagan (Chicago) and David Meiselman (National Bureau of Economic Research), all of whom have been extremely generous in their efforts to improve the article's content and style. Eugene Lerner (Federal Reserve Bank of Chicago) criticised an earlier draft. Lloyd Metzler and Lloyd Mints (both of Chicago) have provided guidance and criticism over a long period of time.

[2] See the authoritative summary and analysis of the debate by Franco Modigliani in "Liquidity Preference and the Theory of Interest and Money," *Econometrica*, January 1944, pp. 45–88 (reprinted in *Readings in Monetary Theory*, ed. by F. A. Lutz and L. W. Mints (Philadelphia, 1950), pp. 186–239). The major integrator of the old and the new, and himself a formulator of the new, was D. H. Robertson in "Some Notes on Mr. Keynes' General Theory of Employment," *Quarterly Journal of Economics*, November 1936, pp. 168–91; "A Survey of Modern Monetary Controversy" in *Essays in Monetary Theory* (London, 1940), pp. 133–53 (reprinted in *Readings in Business Cycle Theory*, ed. by G. Haberler (Philadelphia, 1944), pp. 311–29); and "Mr. Keynes and the Rate of Interest" in *Essays in Monetary Theory*, *ibid.*, pp. 1–38 (reprinted in *Readings in the Theory of Income Distribution*, ed. by W. Fellner and B. F. Haley (Philadelphia, 1946), pp. 425–60). Significant contributions were also made by J. R. Hicks in "Mr. Keynes and the Classics; A Suggested Interpretation," *Econometrica*, April 1937, pp. 147–59 (reprinted in *Readings in the Theory of Income Distribution*, *op. cit.*, pp. 461–76); Oscar Lange in "The Rate of Interest and the Optimum Propensity to Consume," *Economica*, February 1938, n.s., pp. 12–32 (reprinted in *Readings in Business Cycle Theory*, *op. cit.*, pp. 169–92); E. S. Shaw in "False Issues in the Interest-theory Controversy," *Journal of Political Economy*, December 1938, pp. 838–56; F. A. Hayek in *The Pure Theory of Capital* (London, 1941), Chapters 26 and 27; and Arthur Smithies in "The Quantity of Money and the Rate of Interest," *Review of Economic Statistics*, February 1943, pp. 69–76.

[3] "Neo-Keynesian" has reference to present-day followers of Keynes' *General Theory of Employment, Interest, and Money* (New York, 1936).

supply and demand for securities resulting from current flows of saving and investment.[1] This is the explicit basis for the assertion that saving and investment do not directly influence the rate of interest. Regardless of the equilibrium determinants, therefore, the direct function of driving the interest rate from one level to another must be attributed to other variables. There are two views in this regard:

(1) Metzler [2] and Patinkin [3] place causal emphasis on the price level. An excess of total demand over output, for example, raises commodity prices and reduces the real value of cash balances. If liquidity demand is negatively sloped with respect to the interest rate, the public now considers its supply of cash to be inadequate at the prevailing rate of interest. The community therefore offers securities for sale in an effort to acquire cash. But the only result is that security prices fall, or interest rates rise, until the public is willing to hold the reduced quantity of real balances. Patinkin defines the real supply and demand for liquidity in money units, in terms of which there is a different liquidity demand schedule corresponding to each level of prices. Accordingly, a decline in real cash balances causes an upward shift in the demand for money.

(2) The most prevalent viewpoint holds that income, rather than the price level, is the initiating variable. A rise in investment, for instance, raises money income, which raises the "demand for money" and so the rate of interest. Keynes originally defended the doctrine in answer to Robertson,[4] but the argument is implicit in the *General Theory*.[5]

[1] This point of view seems to originate in Keynes' *Treatise on Money*, Vol. I: *The Pure Theory of Money* (London, 1930), 249. See also: Hugh Townshend, "Liquidity-Premium and the Theory of Value," ECONOMIC JOURNAL, March 1937, pp. 157–69; T. Scitovsky, "A Study of Interest and Capital," *Economica*, August 1940, n.s., p. 296; L. R. Klein, *The Keynesian Revolution* (New York, 1947), p. 123; B. F. Haley, "Value and Distribution," in *A Survey of Contemporary Economics*, Vol. I, ed. by H. S. Ellis (Philadelphia, 1948), p. 41; L. A. Metzler, "Wealth, Saving, and the Rate of Interest," *Journal of Political Economy*, April 1951, pp. 102 and 115; H. G. Johnson, "Some Cambridge Controversies in Monetary Theory," *Review of Economic Studies*, 1951–52, No. 2, p. 92; and T. Balogh, "Dangers of the New Orthodoxy," *The Banker*, June 1956, p. 351.

[2] *Ibid.*, pp. 104–5 and 110.

[3] D. Patinkin, "Keynesian Economics and the Quantity Theory," in K. Kurihara, ed., *Post-Keynesian Economics* (New Brunswick, 1954), pp. 138, 139, 143 and 148.

[4] Robertson, "Some Notes on Mr. Keynes' General Theory of Employment," *loc. cit.*, pp. 180–3, and Keynes, "The General Theory of Employment," *Quarterly Journal of Economics*, February 1937, p. 210.

[5] *Op. cit.*, pp. 171–2, 197, 199, 248–9. In each of these passages Keynes says that a rise in income raises liquidity preference. With a fixed stock of money, the higher liquidity demand must raise the rate of interest, given Keynes' own assertion (p. 167) that liquidity supply and demand are the determinants of interest. But the explicit statement that the rise in income raises interest is not made, to my knowledge, in the *General Theory*. It remained for Robertson to draw that acknowledgment out of Keynes.

This view of interest determination is also advanced by Lange, *op. cit.*, pp. 17–18; Scitovsky, *op. cit.*, pp. 302–3 and 308; A. P. Lerner, "Interest Theory—Supply and Demand for Loans or

The neo-classicist, finally, ignores considerations as to old securities or other impediments, and insists that:

(3) Increments in saving and investment act directly on the market rate of interest.[1]

In this paper I will construct a model, representing the Keynesian–classical synthesis, from which the process of adjustment linking different levels of the interest rate can be deduced. This model, described in Part II, integrates the stock-flow capital-market analysis of Scitovsky,[2] Clower [3] and others [4] with a stock-flow analysis of the supply and demand for money. Within this framework Part III describes the impact of an open-market operation by the central bank, and the path by which the system returns to equilibrium. Two equilibrating mechanisms with respect to the interest rate emerge: a "transfer effect" and a "wealth effect." Part IV analyses shifts in saving and investment, and Part V qualifies the analysis for a model not distinguishing active and idle balances. The case of underemployment is discussed in Part VI, and the three viewpoints of interest determination described above are critically examined in Part VII. In this final section I shall argue that the first neo-Keynesian position is valid only within a model that divides money into active and idle portions. I shall demonstrate that the second neo-Keynesian explanation involves a serious confusion in the causal relation between money and income. I shall conclude by showing that saving and investment can act directly upon the interest rate, in spite of a large existing stock of securities.

Supply and Demand for Cash?" *Review of Economic Statistics*, May 1944, p. 91; Mabel F. Timlin, *Keynesian Economics* (Toronto, 1942), p. 156; James Tobin, "Liquidity Preference and Monetary Policy," *Review of Economic Statistics*, May 1947, p. 126; Alvin H. Hansen, *Monetary Theory and Fiscal Policy* (New York, 1949), pp. 81–2; H. G. Johnson, "Some Cambridge Controversies in Monetary Theory," *op. cit.*, pp. 98, 99 and 100; and others.

[1] The adherents to this position include Robertson, "Some Notes," *loc. cit.*, pp. 176–8, and "Mr. Keynes and the Rate of Interest," *loc. cit.*, pp. 18–19; R. S. Sayers, *Modern Banking*, 3rd ed. (Oxford, 1951), Chapter 10; E. S. Shaw, "False Issues in the Interest-theory Controversy," *op. cit.*, pp. 846–50; Hayek, *op. cit.*, Chapter 26; Modigliani, *op. cit.*, pp. 72–3; L. W. Mints, *Monetary Policy for a Competitive Society* (New York, 1950), pp. 33 ff.; A. C. Pigou, *Employment and Equilibrium*, 2nd ed. (London, 1949), pp. 223–9, and *Keynes's "General Theory"* (London, 1952), Chapters 10 and 11; Jacob Viner, "Mr. Keynes on the Causes of Unemployment," *Quarterly Journal of Economics*, November 1936, pp. 147–67; F. H. Knight, "Unemployment: And Mr. Keynes's Revolution in Economic Theory," *Canadian Journal of Economics and Political Science*, February 1937, pp. 100–23; N. Kaldor, "Money Wage Cuts in Relation to Unemployment: A Reply to Mr. Somers," *Review of Economic Studies*, June 1939, pp. 232–5; and H. M. Somers, "Monetary Policy and the Theory of Interest," *Quarterly Journal of Economics*, May 1941, pp. 488–507.

[2] Scitovsky, *op. cit.*

[3] R. W. Clower, "The Dynamics of Investment," *American Economic Review*, March 1954, pp. 64–81; and "Productivity, Thrift and the Rate of Interest," Economic Journal, March 1954, pp. 107–15.

[4] See Kaldor, *op. cit.*, and G. Horwich, *Open Market Operations, the Rate of Interest, and the Price Level* (University of Chicago dissertation, March 1954), Chapters 1 and 3.

II. The Model

A closed economy may be viewed in the aggregate in terms of the factor, output and existing-asset markets. Each of these will be described.

The factor market consists in the supply and demand for all productive agents. We shall assume that this market independently determines a level of output perpetually employing all resources. In the labour market supply is accordingly a function of the real wage, and money wages are perfectly flexible. Taking full-employment output as fixed, we can hereafter ignore the factor market, limiting the analysis to the markets for current output and existing assets.

The output market is the supply and demand for finished goods and services. The supply may be classified into consumer and investment goods.

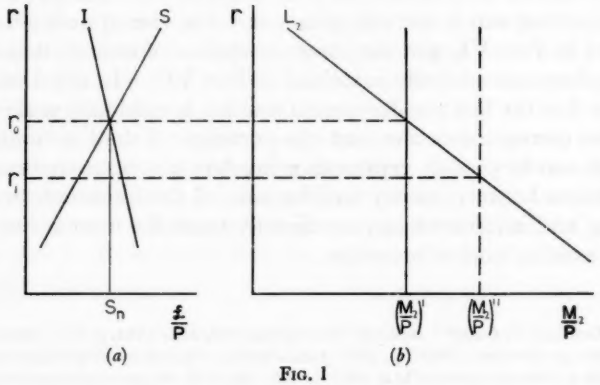

Fig. 1

In fact, since total output is constant, the only non-monetary decision made in this market is the division in production between the two types of goods. But let us first make explicit the role of money. Aggregate demand is the product of the quantity of active money, M_1, and its income velocity, V_1. The demand for active money, L_1, follows the classical monetary theory in which each individual holds a constant ratio of cash to money income. If Y is total money income, M_1/Y equals $1/V_1$, which is akin to Marshallian k. Given M_1, V_1 and real output, y, the general price level, P, equals $\frac{M_1V_1}{y}$.

We define saving as unconsumed income. In Fig. 1 (*a*) the S schedule indicates the monetary amounts of saving forthcoming out of current full-employment income during a given time interval. S represents intended quantities, and in that sense is a positive function of the interest rate, r. Although output is assumed fixed, we shall note that saving and real income

are also positively related. A complete model requires an explicit position on the desired disposition of savings. Accordingly, we define saving as a demand for real capital. Assuming, further, that the claim to capital is a marketable security, saving becomes a demand for securities. One would expect saving, in reality, to be allocated between cash and non-cash assets. But the assumption of some hoarding out of current income would complicate the model considerably without altering the basic argument.

The I curve in Fig. 1 (a) is the familiar investment schedule. For a given time interval, I shows the demand for investible funds as a downward function of the interest rate. We shall assume that all financing is carried out through the issuance of securities in an impersonal market, and that entrepreneurs immediately spend the proceeds on capital goods. I is thus the supply of new securities. Both S and I in real terms are independent of movements in money income for which output is constant. We shall therefore express saving and investment in constant commodity prices.

The existing-asset market is the supply and demand for the community's wealth, produced or issued in the past. The supply consists in two types of assets—first, real idle money, of which the quantity is M_2/P, and second, securities representing all capital units. If M is the total supply of money, $M_2 = M - M_1$. The M_1 balances are excluded from consideration in this market, since their only use is in facilitating the flow of income. We shall simplify the model by supposing that all capital units are identical, as are the securities corresponding to them. We shall suppose, too, that the securities are perpetuities of constant risk and are independent in real value of the price level. The instruments meeting these requirements are equities and consol-type debt, whose interest payments are tied to the price level by "escalator" clauses. If X is the aggregate fixed income from real capital, then S_v, the total value of securities, is X/r.

For a given stock of wealth, we need discuss either the demand for cash or the demand for securities, since one determines the other as a residual from total wealth. Accordingly, the demand for real idle balances, L_2, is drawn in Fig. 1 (b) as an inverse function of the interest rate. We shall assume that any shifts in L_2 or the demand for existing securities occur instantaneously.

A final point regarding the existing-asset market needs to be made explicit. Since asset demand is derived from total wealth, independent changes in wealth must impinge on the existing demand for money, securities or both. A rise in the price level, for example, destroys wealth by devaluing idle balances. Will the public respond by reducing one or both of its asset-demand schedules? In the absence of empirical evidence on this question, we shall make two assumptions: (1) The demands for *both* types of asset shift in response to *any* independent change in wealth. (2) An independent movement in wealth is allocated between the asset-demand schedules as follows: each schedule receives a relative share of the total movement equal

to the ratio of the existing quantity of the particular asset to total wealth. For example, suppose that securities are 90% of wealth. A loss of £100 in the stock of real cash through inflation would result in leftward and parallel movements of both demand schedules, L_2 shifting by £10, and security demand, expressed in real monetary units, by £90. The first assumption can be justified *a priori* by reference to a map of curves of indifference between cash and security holdings. We are assuming that a parallel shift in the budget line results in a corresponding shift in the amounts of *both* assets desired. If, however, the community holds considerably more securities than cash—as would a modern industrial society—then, by the second assumption, security demand will experience most of any wealth-determined shift. The liquidity curve in such an economy will not move a great deal on this account.

The dependence of asset demand on total wealth violates the usual assumption of independence between supply and demand schedules. But this is not surprising, since the market consists in only two commodities—cash and securities. In traditional price theory an uncompensated change in the supply of a single commodity is unlikely to alter significantly the total budget or any single demand schedule. In the existing-asset market this is obviously not so.

In Fig. 1 the stock and flow markets are in joint equilibrium at interest rate r_0. This means that S_n (or its quantity-of-capital equivalent) is added periodically to both the quantity demanded and the existing stock of capital. *Ceteris paribus*, therefore, such a rate of interest remains constant over time. But what determines the rate of interest? Saving and investment are given exogenously to this model. Their equilibrium rate of interest is a unique and constant value to which the existing-asset market must conform. And if liquidity holders are concerned, as rational beings will be, with the purchasing power of their cash balances, the natural rate of interest will be imposed on this market by appropriate values of both nominal idle money and the price level. *I.e.*, for a fixed money supply, there will be some division between M_1 and M_2 such that the resulting price level gives M_2 a real value exactly equal to that demanded at r_0. We noted on p. 629, however, that L_2 is not really independent of the price level—and neither, for that matter, is the stock of capital. The allocation of money between idle and active uses strikes deeper into the system than is immediately apparent.

Rather than dwell on the static equilibrium, let us turn to the process by which the natural and market rates of interest are brought to equality following a monetary disturbance. A description of the time path between equilibria will convey the substance of interest and price-level determination much more readily than would a detailed consideration in static terms. Such an account, though founded on static relationships, will also provide the framework for a short-run dynamic theory of interest and prices.

III. A Monetary Disturbance

Suppose that the central bank, the only money-creating agency, decides to purchase securities from the private sector. We shall assume that the purchase is executed instantaneously, so that we can isolate the various steps in the adjustment process. This limits the bank to a purchase of old or existing securities, since, in a very brief interval, the new securities market is non-existent. The bank executes the purchase by bidding up security prices, thereby lowering the rate of interest. At higher prices asset holders relinquish some of their securities, replacing them with new idle balances provided by the bank. This is shown in Fig. 1 (*b*), where the interest rate and idle balances are, respectively, r_1 and $(M_2/P)''$ after the operation, as compared with r_0 and $(M_2/P)'$ before the purchase. Since an adjustment in stocks has taken place, the lower market rate of interest tends to endure beyond the bank's departure from the market.[1]

What are the forces driving the interest rate back to r_0—the equilibrium natural rate? In addition, can we anticipate an impact of the monetary injection on the price level? The new cash is initially held on wealth account, but are there forces converting these balances to a demand for goods and services? [2] Consider a subsequent period during which the S and I schedules in Fig. 1 (*a*) are relevant. At r_1, intended investment exceeds intended saving. But neither the reduction in desired saving nor the increase in the quantity of investment demand, in themselves, entail an addition to the supply of active balances. Savers, in response to the lower interest rate, divert expenditures from new securities to consumption goods, merely rechannelling active money from one sector of the income flow to another. Entrepreneurs, on the other hand, express their greater investment demand by increasing the supply of new securities. However, in the face of a declining demand by savers, the new issues tend to fall in price. But

[1] If the bank remains in the market for some interval of time, then new securities will be available along with the old. The new issues will consist in additional securities offered by entrepreneurs in response to the lower rate of interest, plus securities which had been going to current savers who have moved into consumption goods. Such security purchases will lead to a direct increment in active balances and the price level, and will furnish no tendency to a lower rate of interest after the operation is completed. Cf. Robertson, "Some Notes," *loc. cit.*, p. 178. Transactions in new securities only is the "classical" or Wicksellian view of banking operations. In particular, see Wicksell's *Lectures on Political Economy*, Vol. II (London, 1935).

[2] We must assume that the monetary authority returns to the community the earnings on its new security holdings. Otherwise, both income and the money supply will fall continuously (see Metzler, *op. cit.*, p. 109, n. 15). The simplest course would be the reduction of personal income taxes, since no repercussions on asset demand and the interest rate would follow. If property taxes are lowered, wealth holders would enjoy a capital gain on securities equal to the bank's security purchase. This would increase both liquidity and existing-security demand. To the extent that security demand rises less than does the new "supply," asset holders move out of securities into cash. This drives the rate of interest up, until supply and demand are again equal. But if the increase in security demand is substantial—as it may well be—the interest rate will not rise much in response to the tax relief.

asset holders cannot permit new securities to bear a higher return than existing ones. An arbitrage movement aimed at equalising their prices is initiated, and the public shifts from old to new securities. As they do so, the general market rate of interest rises, because security holdings cannot be reduced in the aggregate. The rise in the interest rate, in turn, creates a willingness to hold the excess new securities in addition to, and not merely in replacement for, existing ones.[1] In fact, since the excess securities are themselves the cause of these events, the existing-asset market must absorb all that are forthcoming in any period. The significance for the price level is the fact that excess new securities replace idle money, which is expended against them in the arbitrage operation. These funds are swept up by entrepreneurs, who now have at their disposal balances not previously in the income stream. In the absence of offsetting leakages the price level rises.[2]

Let us name this equilibrating tendency in the interest rate, which results from the conjoining of stock and flow markets, the *transfer effect*. It is simply the direct impact of excess investment demand on the market rate of interest. The subsequent increase in the supply of investible funds is simultaneously a reduction in idle money holdings. In terms of a securities market, the quantity of new securities added to the existing stock in the period following the bank's purchase was greater than the increment to demand. The process of aggregation thereby lowers the equilibrium price.[3] An excess of new security supply over demand will continue to be added to the existing-stock schedules until the market and natural rates of interest are equal.[4]

A second upward tendency in the interest rate emerges later when the added flow of active balances (due to the transfer) drives the commodity price level up, reducing the real value of idle money held. This constitutes a loss of disposable wealth in the eyes of the community and leads, on our assumptions, to a diminished (real) demand for both securities and idle cash.

[1] We assume that excess new securities of any period are only a fraction of the number purchased by the bank. The interest rate therefore climbs gradually to its former level. As the interest rate rises, it will reduce the excess supply of securities—both by curtailing the volume of investment and by stimulating saving. If the demand for securities out of current saving rises during the flotation interval entrepreneurs tap money directly from the income stream.

[2] Leakages occur when cash flows from the income stream to idle balances. One possibility is that inventories fall during the inflation, forcing entrepreneurs to retire outstanding securities corresponding to the consumed stocks. This could entail a transfer of active money (from current receipts) to the idle realm. In general, if entrepreneurs fail to realise their capital expenditures in real terms, they might retire outstanding securities and deactivate cash balances. Also, any increase in the savings schedule would increase cash hoards (see p. 635 below). But such leakages can only be temporary, since real saving is assumed to be fixed.

[3] Cf. Clower, *op. cit.*, Kaldor, *op. cit.*, and Horwich, *op. cit.*

[4] Keynes' *Treatise* (*op. cit.*, pp. 226–7) contains a reference to new security flotations as the link between banking operations and the price level. Robertson (" Some Notes," *loc. cit.*, pp. 176–8) appears also to describe banking policy in these terms. And more recently, in " More Notes on the Rate of Interest," *Review of Economic Studies*, 1953–54, No. 2, p. 137, he chided Patinkin for overlooking the rise in the supply of bonds as the mechanism restoring a displaced interest rate.

The decline in the demand for money is less, therefore, than the total loss of real balances, so there remains a net reduction in the real supply of idle money. At the prevailing rate of interest, asset holders move out of securities into money in an effort to replenish the cash deficiency. The attempted mass liquidation of securities cannot fail to raise the market rate of interest, however, and in doing so, it reconciles asset holders to the lower quantity of real balances. We shall designate this additional force on the interest rate the *wealth effect*.[1]

The process of adjustment consists, thus, in a constantly falling real idle money supply in response to both nominal transfers and movements of the

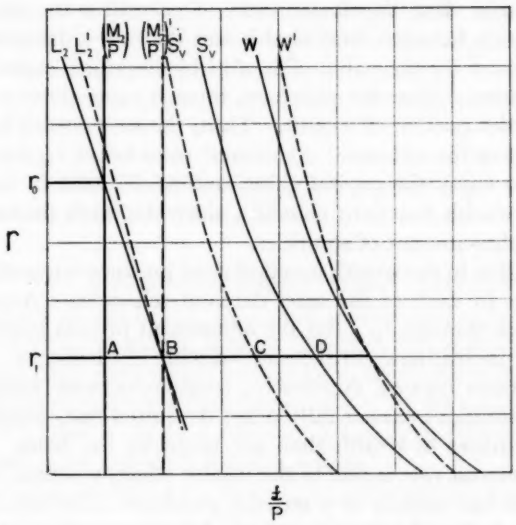

FIG. 2

price level. The interest rate rises until it is once again at r_0. At that point intended saving and investment are equal, and there is no further inducement to transfers of idle balances or movements in the interest rate and the price level.

It appears that in the final equilibrium L_2 will lie to the left of its pre-operation position, owing to leftward movements during the inflation. If money is a small proportion of asset holdings, the total shift in L_2 will not, by assumption, be significant. But whatever the response of L_2 to changing wealth, there are compensating forces tending to shift that schedule to the right. This can be shown by reference to Fig. 2, where the wealth components, measured in pounds of constant purchasing power, are plotted as

[1] In Fig. 1 (*b*) the wealth effect would be shown as a decline in $\frac{M_2}{P}$, accompanied by a smaller leftward shift in L_2. The equilibrium interest rate in the liquidity market therefore rises.

functions of the interest rate. S_v, the total value of existing securities held by the public, is drawn as a rectangular hyperbola in r and S_v. L_2 and $\frac{M_2}{P}$ are the demand and supply of real idle money, while W, the total wealth function, is the horizontal sum of S_v and M_2/P. The pre-operation wealth market is represented by unprimed solid-line schedules, while primed broken-line schedules are those prevailing immediately after the security purchase. r_0 is the natural rate of interest, and r_1 is the rate at which the purchase is executed. CD is the reduction in the value of securities held by the public at r_1. AB, which equals CD, is the money expended against securities by the central bank. But the lower ratio of securities to cash alters the functional relation between total wealth and the rate of interest. Varying interest rates react on the value of wealth by imposing capital gains and losses on securities. After the purchase, interest rates above r_1 reduce the value of a smaller portion of wealth. Thus, the new wealth function, W', lies to the right of the old one. At interest rates below r_1, fewer securities are on hand to enjoy the capital gains, and so W' falls to the left of W. At r_1 the two wealth functions coincide, since the bank exchanges money for an equal value-amount of securities.

Such a rotation in the wealth function must produce sympathetic, though lesser, rotations in each of the asset demand schedules. Accordingly, L_2 rotates clockwise through r_1. But the adjustment process partially reverses this rotation by increasing securities and reducing idle balances. The higher security–cash ratio creates, conversely, counterclockwise rotations in L_2. But the latter rotations cannot fully offset the initial one, since the transfer adds fewer securities to wealth than are taken by the bank. Part of the return of the interest rate is due to the wealth effect, whereas its downward displacement is due entirely to a security purchase. On net, therefore, L_2 is steeper than before the disturbance, and farther to the right at interest rates near r_0. The rotational tendencies in L_2 may thereby counterbalance its leftward shifts in the range of the natural rate.

IV. Saving and Investment

The model of Part II can be readily applied to the case in which a movement in saving or investment is the initiating disturbance. For this purpose, let us again assume full-employment income and the absence of a private banking system. Consider, first, a shift in investment, the supply and demand for money remaining fixed. An increase in investment is an increment to the supply of new securities, which flows on to the existing-asset market. After depressing security prices, the excess supply is exchanged for idle balances.[1] The transfer swells the stream of income and

[1] The increase in interest immediately induces some additional saving, reducing the purchases of new securities by asset holders.

raises the price level, which creates a wealth effect on interest. The rate of interest rises until intended S and I are equal at a higher level. In equilibrium the interest rate, M_1/M_2, total V, and the price level are also higher.[1]

A reduction in investment creates an excess demand for securities by savers. Since the supply of new securities has fallen, savers bid up the prices of existing issues. But as old securities are purchased, we have leakages from the income stream into the stock of idle balances. Complementing the transfer effect on interest is the subsequent price-level decline and wealth effect. Equilibrium consists in a lower interest rate and reduced levels of saving, investment, velocity and commodity prices.

A reduction in saving is merely a diversion of funds from new securities to consumer goods. But the excess supply of new securities raises the rate of interest and activates idle balances by the customary arbitrage operation. Commodity prices rise and the interest rate continues to climb until I equals the lower quantity of saving.

The analysis of an increase in saving is identical to that of a reduction in investment. The outcome differs only in the equilibrium level of investment which rises in this case, instead of falling.[2]

V. A Non-dichotomised Money Supply [3]

Some writers object to the division of money into active and idle components.[4] They argue that it is not a necessary theoretical tool, but serves merely to dramatise phenomena having an exact counterpart in the average velocity of a non-dichotomised money supply.[5] Is the dichotomy crucial to the analysis? Does it imply a different adjustment process than would a properly constructed non-dichotomised system?

The foregoing analysis can, in fact, be expressed in terms of a money

[1] Robertson, in "A Survey of Modern Monetary Controversy," *loc. cit.*, pp. 134–5, refers to the activation of idle money in response to a higher interest rate offered by entrepreneurs. Chapter 10 of Sayers' *Modern Banking*, *op. cit.*, is an excellent account of the direct impact of investment on the interest rate, and the ensuing transfer of idle balances to the income stream. First published in 1938, this work is pre-*General Theory* in spirit. Sayers holds firm to traditional interest theory, but at the same time he captures the essence of liquidity preference (L_2), which is to extend to investment a share in the determination of income as well as of interest. His acknowledgment to the *Treatise* is, I think, too generous. Hayek's description (*op. cit.*) of the impact of investment on liquidity and income is also very lucid.

[2] Cf. also Robertson, "Some Notes," *loc. cit.*, pp. 187–9; "Alternative Theories of the Rate o Interest, II," Economic Journal, September 1937, p. 435; "Mr. Keynes and the Rate of Interest," *loc. cit.*, pp. 18–19; Kaldor, *op. cit.*, p. 234.

[3] I am particularly indebted to Phillip Cagan and David Meiselman for criticisms of this section.

[4] See W. S. Salant, "The Demand for Money and the Concept of Income Velocity," *Journal of Political Economy*, June 1941, pp. 405–6; and H. M. Somers, *op. cit.*, p. 503.

[5] The objection to idle versus active money is sometimes based on its elusive statistical character—it has so far defied identification and measurement. But this consideration is no more relevant than it is when applied to the demand, supply and indifference curves of partial analysis. No one insists—or ought to insist—that the usefulness of the central tools of economic analysis depends on their precise quantification.

supply, the units of which are not functionally specialised. But two conditions must be met by the non-dichotomised model: (1) the velocity of money varies directly with the interest rate; *i.e.*, the general public turns its balances over more rapidly at higher than at lower interest rates; (2) increments in saving and investment exert, as before, a direct impact on the market rate of interest. In Pigou's *Keynes's "General Theory,"* for example, a rise in investment raises the interest rate which raises velocity and money income.

The analysis in terms of our own framework is more complex. In order to see the process clearly, suppose that the "public" excludes entrepreneurs who, like the central bank, stand outside the main stream of economic activity. Consider, again, a rise in investment expenditures financed by issuing securities. The excess new issues of a given period raise the rate of interest, which elicits two reactions from the community: (1) on wealth account the public wants to hold more securities and economise in the use of cash balances—*i.e.*, to carry on a given volume of expenditures with lower average balances; (2) on income account the public wants to consume less and save more. Thus, the total demand for securities rises both as a result of additional quantities of saving and the drawing down of money balances. The transfer of cash from consumption expenditures to saving exerts a depressing influence on the price level. On the other hand, the drawing down of cash balances does not have any tendency to lower commodity prices, since the velocity of remaining balances rises to compensate the loss. Thus, if entrepreneurs were to hoard the proceeds of security sales, the price level would drop less than proportionately to the total transfer of balances. But, in fact, entrepreneurs soon respend borrowed funds, and prices rise proportionately. Since the price level tends to fall only in response to the loss of cash on income account, while it rises in response to the expenditure of the total transfer, commodity prices on net will increase.

The crucial difference between this account and that of the dichotomised model is the absence of a wealth effect on interest in the non-dichotomised system. The wealth effect fails to materialise in the latter model because the rise in prices has no impact on real balances. In the eyes of the public the reduction in real cash occurs via the transfer, during which money balances are exchanged for securities issued by entrepreneurs. The entire transaction is exactly analogous to a continuing open market sale by the central bank. Apart from capital losses imposed on existing securities by the higher interest rate,[1] the public gains in securities what it loses in cash. When entrepreneurs return the borrowed money via capital expenditures, money and prices rise equally, leaving intact the real value of

[1] The effect of capital losses resulting from a higher interest rate is already incorporated in our schedules. One of the likely reasons that the liquidity function is negatively sloped is the fact that total wealth is also a declining function of the interest rate (see Fig. 2 above).

cash balances held by the public. Thus, we may compare the final stage of adjustment to a fiscal deficit, financed by printing money. The ensuing rise in the price level is a reflection of additional money holdings, and has no impact on wealth or the interest rate.[1] In the dichotomised model, on the other hand, the inflation following the transfer creates an unintended devaluation of idle balances that are isolated from the income stream. Since the real value of active money is unaltered by nominal increases, the loss of real idle balances is a net reduction in wealth which reacts on the demand for assets and the rate of interest.[2]

Whether cash is, in fact, dichotomised is an empirical question beyond the reach of *a priori* analysis. Ultimately the choice of models will depend on their predictive power. The point of this discussion is that the adjustment process contains a wealth effect if, and only if, the money supply is dichotomised.

VI. Underemployment

Let us return to an open-market purchase in the dichotomised model. We shall assume, however, that labour is unemployed, and that output, as well as prices, can respond to aggregate demand. The operation lowers the market rate of interest and increases idle balances. The quantity of desired investment rises above saving, and excess new securities at once raise the interest rate and activate idle funds. The increase in expenditures raises employment, output and real saving. Thus, the natural rate of interest falls, and eventually meets the market rate at some intermediate point. If the price level also rises, the wealth effect contributes to the upward course of the interest rate. If money is not dichotomised, the adjustment is essentially the same, except that the wealth effect, in any case, is absent.

[1] We can express the various stages algebraically as follows. The pre-disturbance equilibrium in terms of the equation of exchange is $M_0V_0 = P_0T$. Then, investment demand rises, and during some finite period entrepreneurs borrow an E quantity of cash balances, of which E_w is taken from wealth holders and E_s from current savers. If V_s is the average velocity of the balances withdrawn from savers, then total payments and receipts will fall on this account by E_sV_s. Assuming that velocity rises to, say, V_1, offsetting the effect on payments of the loss of E_w balances, we have at this stage, $(M_0 - E)V_1 = P_0T - E_sV_s$. Finally, entrepreneurs "return" the borrowed funds, raising total payments by EV_1. The final equilibrium is thus $M_0V_1 = P_0T - E_sV_s + EV_1$. The value of money directly before and after the entrepreneurial injection is $\frac{M_0 - E}{(P_0T - E_sV_s)/T}$ and $\frac{M_0}{(P_0T - E_sV_s + EV_1)/T}$, respectively. In order to show that these two terms are equal, substitute $V_1(M_0 - E)$ for $P_0T - E_sV_s$ in both denominators.

[2] Before the disturbance we have $M_1V_1 = PT$, where the subscript, 1, refers to active balances. If ΔM_2 is the quantity of idle balances converted into active money, the final equilibrium is $(M_1 + \Delta M_2)V_1 = P'T$. The real value of all balances before the disturbance is $\frac{M}{P} = \frac{MT}{M_1V_1}$, where $M = M_1 + M_2$. In the final equilibrium real balances are $\frac{M}{P'} = \frac{MT}{(M_1 + \Delta M_2)V_1}$, which is clearly a smaller quantity.

VII. Alternative Theories Reconsidered

(i)

We are now prepared to examine critically the three views of interest determination described in Part I. The first neo-Keynesian position, held by Metzler and Patinkin, attributes interest movements to the revaluation of cash by the price level. This corresponds roughly to our wealth effect (see pp. 632–3). But Patinkin's view of interest determination is best discussed in the context of his total analysis of a monetary disturbance. His model will therefore be described in more detail.

Patinkin [1] aggregates the spending functions into a total demand-for-goods schedule which varies directly with income and inversely with the interest rate. He is not explicitly concerned with the components of demand—consumption, or saving, and investment—although he acknowledges their existence. In the liquidity market there is a demand for real (non-dichotomised) cash balances, varying inversely with the interest rate and directly with income. He expresses this function in money units, so that it also varies directly with the price level. Although aggregate product demand is initially dependent on real cash balances, Patinkin later drops that assumption.[2] Employment is full, there is no banking system and in all essential respects this model is the same as mine, except that money is not dichotomised.

Patinkin analyses the following disturbance: the Government increases its public works expenditures for one period only, financing the deficit by printing new money. In terms of my framework the fiscal deficit involving money creation corresponds exactly to the second half of the adjustment process described in Part V. In fact, on p. 637 the " return " of borrowed funds by entrepreneurs in the non-dichotomised model was compared to a governmental expenditure. The sequence is very simple: new money, received by the community as current income, is spent on commodities whose prices rise proportionately; real saving, investment, cash, wealth and the rate of interest, are all constant, except for possible temporary deviations. However, Patinkin's account is quite different. In his own words:

> " . . . the effect of an increase in the amount of money does not act directly through aggregate demand, but indirectly, through the liquidity-preference function. The increased holdings of money increase the demand for bonds, and thus cause the rate of interest temporarily to decline. This shifts the expenditure function upward, creating an inflationary gap, and a consequent rise in the price level. As a result of the increased price level, the demand for money shifts to the right. This eventually puts an end to the decline in the interest rate, which now begins to rise. Clearly this process must continue until the rate of interest rises once again to its original level. For at any lower rate

[1] See Patinkin, " Keynesian Economics and the Quantity Theory," *op. cit.*, pp. 125–32.
[2] *Ibid.*, pp. 148–9.

an inflationary gap will still exist, causing prices to rise more, and the demand for money to shift over still further to the right." [1]

As Patinkin observes in a previous footnote,[2] this analysis is adapted from p. 200 of Keynes' *General Theory*. Keynes initiated the view that an increase in money by a fiscal deficit raises income or prices only by lowering the rate of interest. Is this a valid or self-consistent proposition? As an empirical fact, additional cash flowing from a deficit is an increment to wealth and may, indeed, be expended on bonds. Since expenditures out of wealth are instantaneous, the interest rate would fall [3] and, by assumption, aggregate demand would rise. But how is the rise in demand financed? Without further monetary injections, there are only two possibilities: a reduction in the demand for money (dishoarding), or security flotations by entrepreneurs in excess of current saving. While dishoarding is certainly a possibility, there is no *a priori* reason why spenders should coincidentally choose this moment to unload cash holdings. In fact, for Patinkin, security flotations are the only admissible source of funds, since the main conclusion of his article requires a fixed real demand for money.[4] What then? Keynes and Patinkin conveniently assume that expenditures induced by the lower interest rate are treated by their recipients as current income, available for respending on goods and services. Thus will commodity prices rise. But this whole analysis implies rank discrimination by income earners between their sources of funds: money acquired as additional income in public-works employment is diverted wholly to the bond market; money paid out as wages by private enterprise is passed on in the purchase of current production. If Keynes and Patinkin retained their initial view of the monetary injection, they would assume that money flowing from either source is regarded as an increment to wealth, available only for security purchases. This would create an impasse in which money is forever transferred back and forth between income recipients and entrepreneurs via the bond market; the interest rate is permanently lower and the price level does not stir.

The way out of this difficulty is to acknowledge that the increase in cash resulting from the deficit is itself a rise in income, and a sufficient cause of additional expenditures on goods and services. If funds are initially treated as wealth, the liquidity market may provide a route to the price level. But this requires an explanation of why entrepreneurial injections are suddenly regarded as income rather than wealth.

Finally, Patinkin argues that the rise in commodity prices raises the

[1] Patinkin, "Keynesian Economics," *op. cit.*, p. 148.

[2] *Ibid.*, p. 146, n. 29.

[3] If the additional money were treated as income, that part of it earmarked for savings would be turned over at the usual finite velocity, and could lower the interest rate only if the money value of investment failed to rise equally. The distinction between money as wealth and as income is thus crucial for the course of the interest rate.

[4] Patinkin shows that an increase in money raises prices proportionately, even though the (fixed) demand for money is a function of the interest rate.

demand for money and the rate of interest. If the inflation occurs as a result of excess security flotations, then, by our previous analysis (Part V), Patinkin's non-dichotomised model precludes this source of interest movement. If the inflation is a direct consequence of the deficit, without benefit of liquidity-market causation, then prices and money move proportionately from the beginning, and real balances are unaltered. Again there is no impact of the price level on the interest rate by way of a reduction in real balances and wealth.[1]

Patinkin's fundamental error is his neglect of saving and investment in the adjustment process. Granted that funds go initially to the liquidity market, an earlier assumption (*op. cit.*, p. 126 n. 20,) that the capital stock is fixed throughout the analysis is incompatible with the very possibility of an adjustment. Thus, it is not sufficient to describe the cause of inflation as an excess of expenditures over output. The analysis must also take account of underlying security issues, real capital formation and monetary transfers, all of which form the link between the liquidity market and the price level.

(ii)

The second neo-Keynesian opinion attributes interest movements to the change in the demand for money induced by income. This view will not, in general, withstand scrutiny. There is only one interpretation of the "income theory" that is logically acceptable. In that version money is dichotomised and the change in income is a change in the price level only. The "demand for money" is a demand for nominal cash which varies directly with commodity prices. Thus, the change in the demand for money corresponds to the change in the supply of real cash by which the wealth effect in our own formulation operates.[2] Presumably, the demand will rise or fall proportionately less than the movement in prices, owing to the change in wealth. But this is not the dynamic inter-play usually implied by the income explanation of interest. Consider, for example, the following quotations from Lange, Hansen and Tobin—in that order:

> "... for the reaction of the rate of interest to these [the marginal efficiency of investment and the propensity to consume] is due to the influence which the change of income caused by them exerts upon liquidity preference." [3]

[1] Patinkin, *op. cit.*, p. 139, n. 20, identifies his account of movements in the interest rate—first down, then up—with the classical tradition. He cites passages in Ricardo, Mill, Marshall and Wicksell, all of which describe a similar course of the interest rate. But Patinkin and the classical writers are not writing about the same thing. The latter are concerned with a change in the money supply induced by the banking system. Then, indeed, will the interest rate initially fall, and rise later. Patinkin, on the other hand, is writing about a deficit in a bank-free non-dichotomised model. In that case the interest rate will fall only if additional cash is regarded as wealth, or if, for some reason, real saving rises above investment during the adjustment process.

[2] See Patinkin, *op. cit.*, p. 129.

[3] Lange, *op. cit.*, p. 18.

> " It is clear that productivity and thrift have very much to do with the rate of interest. A change in thrift will affect the consumption function and in this way influence the level of income; and the level of income will in turn affect liquidity preference and so the rate of interest. It is not true that an increase in the marginal efficiency of capital (caused, for example, by a higher level of technique) will have no effect on the rate of interest. An upward shift in the marginal efficiency schedule will affect the rate of interest through its effect on income, which in turn will affect the liquidity preference schedule and so the rate of interest." [1]

> " Similarly on this set of assumptions [*i.e.*, that the liquidity preference function is interest-elastic, and so is either saving or investment], an increase in spending without any increase in M can succeed in expanding income. The additional transactions demand for money will raise the interest rate, and this rise in the interest rate will induce the community to hold smaller idle balances. Greater working balances are thereby made available to support a higher money national income." [2]

In each case income is obviously not identified as the price level, and so we must accept at face value the terminology used. Is there some means, then, by which movements of income, whether real or monetary only, act upon the interest rate?

Suppose that a rise in money income is due to an expansion of investment activity not immediately matched by an equal increase in saving. The initiating entrepreneurs must secure additional funds either by spending given active balances more rapidly or by activating idle cash or bank reserves. In any case the increment to money income for each individual is *ipso facto* an increase in active balances received. And to bring average money holdings to the appropriate higher level, the receiving units need only continue to spend at the prevailing (and presumably unchanged) velocity. There is no further independent action that needs to be taken with respect to active or, for that matter, inactive balances. The additional transactions demand for cash is provided for by the rise in income that motivates it, and apart from the price level, there is no mechanism remaining for a direct effect on the rate of interest.[3]

I have argued that the rise in interest is caused directly by the rise in investment which is not self-financed. This reacts on liquidity demand and releases idle balances for expenditure. Accordingly, the rise in the supply of active money is not a consequence of the rise in income, but is rather its cause, and this is the fundamental difference between the Keynesian version and my account. In all of the quoted passages there is the clear implication

[1] Hansen, *op. cit.*, pp. 81–2. [2] Tobin, *op. cit.*, p. 126.

[3] The rise in transactions demand is thus a movement *along* the demand curve for M_1, expressed as a function of income. This is completely analogous to the simple case of an increase in the supply of a commodity which, through lowering price (in our case, raising income), induces a movement along the fixed demand schedule.

that the rise in income occurs, somehow, independently of the quantity of money. The increase in income generates a greater (transactions) demand for cash, which in turn raises the interest rate and depletes idle balances. The sequence is thus from higher income to higher active balances—rather than the other way around. Admittedly, productive activity may anticipate the actual receipt of cash,[1] but any impact on interest occurring thereby is only temporary, pending monetary payment. Where the pre-Keynesian neglected the impact of money on the interest rate, there is no doubt that on occasion the Keynesian loses sight of the fact that money is also a medium of exchange.[2]

(iii)

The entire analysis has supported the contention that changes in saving and investment react directly on the market rate of interest. Can this position be reconciled with the neo-Keynesian argument that the old securities market, by dint of superior size, dominates the new security schedules, and so the rate of interest? The quantitative comparison between new and old security markets is, in fact, an unreliable indication of the direct ability of either market to dominate the interest rate. This is because the impression of what saving and investment might do to interest depends on whether they are viewed as security or monetary schedules. For example, an increment in new security demand is also a rise in money saving whose potential impact on the interest rate may be gauged by reference to the magnitude of existing idle balances (or total balances, if money is not dichotomised). This is not to say that the entire saving increment will become idle money (or held on wealth account)—only that one may compare the rise in money saving with idle balances as an alternative means of anticipating the impact on interest. If the supply of money is dwarfed by the stock of securities, then the rise in saving promises to be much more impressive when compared with idle balances than with existing securities. Even though the increment to the security market were relatively infinitesimal, the concurrent rise in money saving could be a substantial fraction of the existing supply and demand for money. Thus, the comparison of market sizes yields contradictory evidence on the direct importance of saving and investment to the interest rate.

A more fruitful consideration bearing on the interest impact of new supply and demand is the absolute *slope* of the existing-security demand

[1] Cf. Gardner Ackley, "The Multiplier Time Period," *American Economic Review*, June 1951, pp. 350–68.

[2] Robertson, in "Some Notes," *loc. cit.*, pp. 187–8, and "Mr. Keynes and the Rate of Interest," *loc. cit.*, p. 19, offers the correct alternative to the second neo-Keynesian account. He attributes to an increase in saving a direct impact on the rate of interest and a subsequent lowering of income. While Robertson regards the Keynesian explanation as "misleading," he does not question its internal consistency. In "Comments on Mr. Johnson's Notes," *Review of Economic Studies*, 1951–52, No. 2, pp. 107–8, Robertson explicitly grants logical, if not empirical, plausability to the Keynesian account.

schedule. The greater is that slope, the more effective is any increment in altering the rate of interest. The evidence that existing-security demand is, in fact, a schedule of substantial slope is as follows. The demand schedules for existing securities and money are complements with respect to total wealth, their slopes tending to mirror each other.[1] Moreover, the slope of L_2 is in general appropriate to a market the size of M_2 rather than existing securities.[2] If M_2 is small relative to existing securities, and L_2 is not highly elastic, the complementary security demand schedule will have an inappropriate slope—one much greater than is ordinarily found in a market of such considerable magnitude. The freedom to move between cash and securities is limited, as it were, by the preponderance of securities held. An increment to existing-security demand is added thus to a schedule of considerable slope, and the opportunities for altering the interest rate and retaining saved funds for the income stream are significantly enhanced.

(iv)

We can summarise our criticism of alternative theories by two propositions: (1) The quantity of money is the efficient agent—*i.e.*, the direct cause, in income determination. (2) Macro-static analysis cannot disregard the role of capital accumulation in the process connecting different levels of equilibrium. Both Patinkin and the Keynesian writers were guilty of detaching income from the quantity of money. For Patinkin, income could rise in response to a fall in the interest rate, but not to an increase in the money supply as such. Lange, Hansen and Tobin saw income rising in response to consumption or investment " expenditures," in terms of which the quantity of money was at most an afterthought. Nor was there any direct connection between the expenditures and security issues. Patinkin, finally, attributed interest movements to a decline in the real value of cash balances. This position could be defended only on the assumption that the stock of capital did not rise equally during the adjustment process.

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[1] The complementarity pertains to liquidity preference and existing-security demand in *value* terms; *i.e.*, the latter schedule shows the number of dollars wealth holders are willing to have embodied in securities at each rate of interest. The value schedule is constructed by taking the product of price and quantity-of-securities-demanded at each price (in our case, at each interest rate). The slopes of the total value and quantity-demanded curves are, of course, related. A very steep negatively-sloped value curve (drawn with respect to price) implies a similarly inclined demand schedule. If the value function is positively-sloping, the demand curve is very flat, though negatively inclined. The relation between L_2 and the security-demand value curve is not, incidentally, a simple 90° complementarity. The curves sum horizontally to the wealth function, which is a rectangular hyperbola removed from the origin by the value of money held (see Fig. 2 above). If L_2 increases very rapidly for low interest rates, as it well may, then, in fact, the complementarity is not far from 90°.

[2] See James Tobin, " Liquidity Preference and Monetary Policy," *op. cit.*, pp. 130–1, and "Monetary Velocity and Monetary Policy: A Rejoinder," *Review of Economic Statistics*, November 1948, pp. 314–17.

EXPENDITURE TAXES, IMPORTS AND GROSS DOMESTIC PRODUCT AT MARKET PRICES

THIS article is concerned with: (i) drawing attention to the new United Kingdom definition of gross domestic product at market prices, which first appeared in the 1954 *National Income and Expenditure Blue Book* in terms of the statistics for 1948; (ii) discussing the implications of the new definition; (iii) questioning its validity, and (iv) pointing out that with the new definition there is a small gap in the *Blue Book* statistics which needs to be filled so that the private investigator can calculate the aggregates appropriate to the new definition for years other than 1948.

I

Descriptive and analytical studies based on national-income statistics are likely to be concerned with any or all of several main national aggregates, some of which the private investigator might have to derive for himself. It would be unreasonable to expect the official statisticians to prepare estimates of every aggregate that might be of use to the private investigator, or to present the data in as many forms as there might be purposes for which it could be used. In general, the most we expect of the officials is the provision of so much detail that the user can calculate certain aggregates for himself, or rearrange the material to suit his own particular purpose. But it is desirable that a system of national accounts should conform with international practices and conventions, unless there are very good reasons justifying national idiosyncrasies or for believing that an international practice or convention is wrong. Through the efforts of the United Nations,[1] the Organisation for European Economic Co-operation [2] and authors of relevant articles in the academic journals, a large measure of uniformity has been achieved in the presentation of national economic accounts and in the definitions of the concepts used in such accounts. Such uniformity of practice is especially evident in terms of the definitions of the *national* and *domestic* product aggregates at market prices and at factor cost. Most economists, familiar with national-income statistics, without hesitation would: (i) define the *national* and *domestic* aggregates so that the difference between them consists of net income from abroad, and (ii) define their values at market prices and at factor cost so that their difference consists of taxes on expenditure net of subsidies.

The national-income *Blue Books* do not contain estimates of the gross national and domestic-product aggregates at market prices (with the

[1] *A System of National Accounts and Supporting Tables* (United Nations, 1953).

[2] *Studies in Methods*, Series F, No. 2 (1953) and No. 8 (1955), Organisation for European Economic Co-operation.

exception of 1948 in the case of gross domestic product at market prices), but they do, of course, contain estimates of these aggregates at factor cost (see Table 1 of the *Blue Books*). The difference between the *Blue Book* estimates of gross national product at factor cost (GNPf) and gross domestic product at factor cost (GDPf) consists of net income from abroad. With international practice the addition of taxes on expenditure net of subsidies to GNPf and to GDPf would produce gross national product at market prices (GNPm) and gross domestic product at market prices (GDPm), so that GNPm would also exceed GDPm by net income from abroad. Up to the publication of the 1953 *Blue Book* the official statisticians would not have quarrelled with this method of obtaining GNPm and GDPm from their values at factor cost, and evidently they still believe the method is appropriate to the *national* aggregates. For instance, in *Sources and Methods* [1] they write, "Some authorities prefer to express the aggregate national product and national expenditure at market prices. This can easily be done from the United Kingdom statistics by adding taxes on expenditure to, and subtracting subsidies from, the aggregate shown at factor cost" (p. 13). In 1953 the last sentence could also have applied to the domestic aggregates. The *Blue Book* of that year contains a new section entitled "Output and Expenditure at Constant Prices, 1946–1952" (pp. vii–x), and in the lower half of Table 1 of this section are given estimates of the components of gross domestic product at 1948 market prices. (The aggregate is actually called "Total gross domestic expenditure," but in the corresponding table of later *Blue Books*, that is the upper half of Table 12, this expression is replaced by "Gross domestic product," and the original expression is applied to the sum of the first three items of the table.) Since the estimates of Table 1 (lower half) are at 1948 market prices, the only estimate of GDPm is that of the base year. The relevant estimates for 1948, from the 1953 *Blue Book*, are presented below.

National aggregates.	£ million.	Domestic aggregates.	£ million.
Gross national product at factor cost	10,216	Gross domestic product at factor cost	10,024
+ Taxes on expenditure	2,020		2,020
− Subsidies	− 571		− 571
Gross national product at market prices	11,665	Gross domestic product at market prices	11,473

It is apparent from the above table that GNPm and GDPm exceed their values at factor cost by taxes on expenditure net of subsidies. It may also be seen that the national aggregates exceed the domestic aggregates by £192 million, which is the 1953 *Blue Book* estimate of net income from abroad.

In the 1954 *Blue Book*, however, the definition of GDPm is changed,

[1] *National Income Statistics: Sources and Methods* (Central Statistical Office, 1956).

causing the above relationships to exist no longer. So far the new definition of GDPm has attracted little attention, which is surprising since it: (i) constitutes a national idiosyncrasy; (ii) results in internal inconsistencies; (iii) appears to lack adequate theoretical justification, and (iv) cannot be calculated by the private investigator for years other than 1948.

In the remainder of this article the nature and implications of the new definition are examined, and some reasons are given for believing that its introduction was unwarranted.

II

The definitions of the relevant concepts and the relationships between them, and the inconsistencies which result from the new definition of GDPm, may be stated in terms of the following symbols.

Let C stand for total consumption expenditure at market prices (that is, consumers' expenditure and current expenditure by public authorities on goods and services);
I stand for gross investment expenditure (that is, gross capital formation) at market prices;
X stand for exports of goods and services;
Xi stand for property income received from abroad;
M stand for imports of goods and services;
Mi stand for property income paid abroad;
Te stand for taxes on expenditure;
Tn stand for subsidies (that is, negative taxes); and
Tm stand for that part of taxes on expenditure (Te) levied on imports (or on withdrawals from Bond).

With the exception of Tm, the numerical values of the above symbols appear in Tables 1 and 7 of the *Blue Books*. No estimates of Tm appear in the *Blue Books*, and this is the gap in the statistical data referred to in the introduction.

The definitions of the relevant concepts appropriate to international practice, and pre-1954 United Kingdom practice, are:

$$\text{GNPm} = \text{C} + \text{I} + \text{X} + \text{Xi} - \text{M} - \text{Mi} \quad . \quad . \quad . \quad . \quad . \quad (1)$$

$$\text{GNPf} = \text{C} + \text{I} + \text{X} + \text{Xi} - \text{M} - \text{Mi} - \text{Te} + \text{Tn} \; . \quad (2)$$

$$\text{GDPm} = \text{C} + \text{I} + \text{X} - \text{M} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

and

$$\text{GDPf} = \text{C} + \text{I} + \text{X} - \text{M} - \text{Te} + \text{Tn} \quad . \quad . \quad . \quad . \quad (4)$$

Appropriate comparisons of these definitions (that is 1 with 2, 3 with 4, 1 with 3 and 2 with 4) clearly reveal the relationships already mentioned. The aggregates at market prices exceed their values at factor cost by Te − Tn, that is taxes on expenditure net of subsidies, and the national aggregates exceed the domestic aggregates by Xi − Mi, that is net income from abroad. These definitions and relationships are illustrated numerically, for 1948 and

1955, in Tables I and II. The upper section of Table I shows how GNPm and GDPm are derived, and the lower section shows how they exceed their factor-cost values by taxes on expenditure net of subsidies. Table II

TABLE I

Derivation of Gross National and Domestic Products at Market Prices and at Factor Cost for 1948 and 1955 *

(£ million)

	1948.	1955.		1948.	1955.
Total consumption expenditure at market prices (C)	10,232	15,975	(C)	10,232	15,975
Gross capital formation (I)	1,610	3,165	(I)	1,610	3,165
			GROSS DOMESTIC EXPENDITURE at market prices	11,842	19,140
+ Exports (X) and income from abroad (Xi) 1,991 (3,892) † / 397 (591)	2,388	4,483	+ (X)	1,991	3,892
− Imports (M) and income paid abroad (Mi) 2,197 (4,119) / 210 (446)	−2,407	−4,565	− (M)	−2,197	−4,119
GROSS NATIONAL PRODUCT at market prices	11,823	19,058	GROSS DOMESTIC PRODUCT at market prices	11,636	18,913
− Taxes on expenditure (Te)	−2,020	−2,620		−2,020	−2,620
+ Subsidies (Tn)	573	346		573	346
GROSS NATIONAL PRODUCT at factor cost	10,376	16,784	GROSS DOMESTIC PRODUCT at factor cost	10,189	16,639

* Sources: Tables 1 and 7 of the 1956 *Blue Book*. Table 7 is used to obtain the separate estimates of the two parts of "Exports and income from abroad" and "Imports and income paid abroad." The method used to derive these national and domestic aggregates is that of the 1953 *Blue Book* and the United Nations' *Studies in Methods*, Series F, Nos. 1 and 8.

† The figures in brackets refer to 1955.

TABLE II

Net Income from Abroad and the National and Domestic Aggregates

(£ million)

	1948.	1955.		1948.	1955.
At factor cost			*At market prices*		
Income from abroad (Xi)	397	591			
Income paid abroad (Mi)	210	446			
Net income from abroad (Xi − Mi)	187	145		187	145
+ Gross Domestic Product at factor cost	10,189	16,639	+ Gross Domestic Product at market prices	11,636	18,913
Gross National Product at factor cost	10,376	16,784	Gross National Product at market prices	11,823	19,058

shows that the national aggregates exceed the domestic aggregates by net income from abroad.

The left-hand side of Table I closely resembles the top half of Table 1 of the *Blue Books*. The only differences are that our C and I items are given with more detail in the official table, and that property income from

(Xi) and to (Mi) abroad are shown as separate items in our table. Clearly the GNPm aggregate could be inserted in the official table in exactly the same position as it occupies in our table.

At this point it may be useful to comment on the relationship between national and domestic aggregates. The distinction between national and domestic aggregates isolates that part of income or product accruing to a country but not due to current economic activity within the domestic territory. It includes taxes paid by foreigners to the government of the domestic territory, but in the main it consists of rent, interest, profits and dividends received from overseas by residents of the domestic territory. An increase in the earnings of property owned abroad, due to increased efficiency abroad, cannot be said to be due to current economic activity within the domestic territory and, therefore, needs to be isolated from the domestic product which does result from current economic activity within the domestic territory.

In the 1954 *Blue Book* (Table 11, but Table 12 in the 1955 and 1956 *Blue Books*) GDPm is still defined as C + I + X − M, but M is valued to include taxes levied on imports or on withdrawals from Bond. With our terminology the new definition becomes GDPm = C + I + X − M − Tm. When this definition is compared with definitions (1) and (4), it is apparent that GNPm now exceeds GDPm by Xi − Mi + Tm, and that GDPm now exceeds GDPf only by Te − Tn − Tm. These results are illustrated numerically in Table III. Since, as already noted, *Blue Book* estimates of gross domestic product are only at constant factor cost or at constant market prices, the only *Blue Book* estimate of gross domestic product at current market prices is that for 1948, the base year. The question marks in the 1955 columns can be only removed when information of the value of taxes levied on imports (Tm) is made available.

It is evident, from Table III, that with the new definition of GDPm, GNPm now exceeds GDPm by net income from abroad (Xi − Mi) *plus* taxes levied on imports (Tm). But from Table II it is evident that GNPf exceeds GDPf only by net income from abroad. This is an illogical state of affairs, since there are now two widely differing measures for whatever is intended to distinguish a national from a domestic aggregate. There may be room for controversy on how the distinction between national and domestic aggregates should be defined, but only one definition and one numerical measure of the distinction is permissible in any single system of accounting. Furthermore, a value which includes taxes levied on imports, and which can vary with changes in the volume of imports or the rates of taxes levied on them, can hardly be a useful or reasonable measure of income accruing to a nation but not due to current activity within the domestic territory.

It is also evident, from Tables I and III, that there are now two measures of the difference between the values of aggregates at market prices and at factor cost. In Table I GNPm exceeds GNPf by taxes on expenditure net

of subsidies (Te — Tn), but in Table III GDPm exceeds GDPf only by taxes on expenditure net of subsidies and taxes levied on imports (Te — Tn — Tm). This is also an illogical state of affairs.

With the new definition of GDPm inconsistency with international practice is inevitable, but it is remarkable that the new definition was introduced in spite of obvious internal inconsistencies, or alternatively, it

TABLE III

Derivation of Gross Domestic Product at Market Prices Using the Present Official Method *

(£ million)

	1948.	1955.		1948.	1955.
(C)	10,232	15,975			
(I)	1,610	3,165			
Gross Domestic Expenditure at market prices	11,842	19,140			
+ (X)	1,991	3,892			
− (M) †	−2,998	− ?			
Gross Domestic Product at market prices	10,835	?	Gross Domestic Product at market prices	10,835	?
+ Net income from abroad (Xi − Mi)	187	145	+ Subsidies (Tn)	573	346
+ Taxes levied on imports ‡ (Tm)	801	?	− Taxes on expenditure net of taxes on imports (Te − Tm)	−1,219	?
Gross National Product at market prices	11,823	19,058	Gross Domestic Product at factor cost	10,189	16,639

* Sources: Tables 1, 7 and 12 of the 1956 *Blue Book*.

† This estimate of M exceeds the estimate of M in Table I by the value of taxes levied on imports.

‡ This estimate is not obtained directly from the 1956 *Blue Book*: it is derived by deducting M of Table I from M of Table III.

is remarkable that further change was not introduced simultaneously to prevent the appearance of internal inconsistencies. Internal consistency can be secured quite easily. On the assumption that net income from abroad is a sensible measure of the difference between national and domestic aggregates, internal consistency can be secured by defining GNPm as C + I + X + Xi − M − Mi − Tm. So defined, GNPm would exceed the new GDPm by Xi − Mi, producing consistency with the difference between GNPf and GDPf, and both GNPm and GDPm would exceed their values at factor cost by Te − Tn − Tm. But advocates of this solution would have to justify the new definition of GNPm, and they would also have to show why Te − Tn − Tm could be considered a satisfactory measure of the difference between aggregates at market prices and at factor cost.

III

Why did the official statisticians consider it necessary to change their earlier, and generally accepted, definition of GDPm by adding to −M the value of taxes levied on imports? The *Blue Books* surprisingly offer no explanation at all, but a brief and inadequate explanation is given in *Sources and Methods*. There is a discussion of the relevance of valuation problems to welfare on pp. 13 and 14; a discussion of Output and Expenditure at Constant Prices on pp. 37–44, which manages to avoid explaining why imports must be valued to include taxes levied on them; and a paragraph on pp. 347–8 which gives the answer " . . . that the market prices of imports, as of other goods, must include any customs and excise duties which they attract, since it is the price including duty which the purchaser has to pay, and which therefore affects substitution at the margin between different commodities, whether home-produced or imported." For a more adequate explanation it is necessary to turn to two recent articles by J. L. Nicholson of the Central Statistical Office.[1]

Since it is easy to come to grief in the chimerical worlds of welfare economics, it is fortunate that the new official definition of GDPm can be criticised without entering these worlds. It is in order, however, for us to observe that it is indeed a brave and surprising gesture by the official statisticians in defining what they believe to be a welfare concept and in expressing it in quantitative terms. This can be said without implying approval.[2] To many it has long been apparent that pure theory has produced models which postulate intricate relationships between highly idealised concepts, much in advance of the available resources of economic observation and statistical techniques necessary for verification and implementation in quantitative terms, and that this applies to national economic accounting in spite of the advances in the past decade.[3] It is, for instance, still impossible to give a satisfactory definition of " maintaining capital intact " suitable for incorporation in national economic accounting and also consistent with capital theory. But if the official statisticians are to embark on an attempt to absorb welfare economics into their terrain the insoluble problems will multiply and national economic accounting will indeed become a controversial subject.

[1] " Some Problems in the Measurement of Real National Income," Income and Wealth, Series IV, pp. 145–66 (Bowes and Bowes, 1955), and " National Income at Factor Cost or Market Prices?" Economic Journal, Vol. LXV, pp. 216–24, June 1955. (The same journal contains a review article by Nicholson, " The International Comparison of National Products," in which much of the argument of the other articles is repeated.)

[2] I see no reason for agreeing with Mr. M. H. Dobb (Economic Journal, June 1956) that the solipsist (as he uses the word) must keep silent about national income. The various national accounting aggregates, and changes in them, may have no welfare meaning, but that does not mean that they have no meaning at all.

[3] For some supporting evidence of this view see *On the Accuracy of Economic Observations*, by Oskar Morgenstern (Princeton University Press, 1950), and the author's " The Reliability of National Income Statistics," *Accounting Research*, Vol. 8, No. 3, July 1957.

To turn to the question posed at the beginning of this section, using the official terminology, why should GDPm be defined as C + I + X − M, with M valued to include taxes levied on imports? Gross domestic product is concerned with the product accruing to a nation as a result of economic activity within the domestic territory. In a closed economy the distinction between national and domestic aggregates disappears, since the two aggregates are identical. GDPf consists of the sum of factor incomes resulting from the production of C + I. Since subsidies (Tn) reduce the prices of products to the purchaser and taxes on expenditure (Te) increase them, the value of C + I at market prices (that is GDPm) is equal to GDPf + Te − Tn. In an open economy some of current output is exported, but the goods and services remaining available for purchase within the domestic territory are augmented by imports. In defining GDPm, these international transactions have to be taken into account, and their values have to be measured. Some imports form a part of the value of exports, and the remainder are included in C + I. Expenditure on C + I, at market prices, constitutes *total domestic expenditure*, and includes the whole of Te − Tn. But total domestic expenditure includes the expenditure at market prices on imports not included in exports, but excludes overseas expenditure on United Kingdom exports. To obtain the value of what is actually paid for GDPm, exports must be added to C + I and imports must be deducted.

But how must exports and imports be valued? Both the old and the new definitions of GDPm value exports at the prices received for them by the exporting nation from the importing nation, since this measures the value of claims on foreign production earned by the exports. It seems equally reasonable to value imports at the prices received for them by the overseas supplier, since this measures their true supply price to the importing nation. With this reasoning GDPm = C + I + X − M, and exceeds GDPf by Te − Tn. The new official definition of GDPm values imports not at their supply price to the importing nation but at the value which it chooses to attach to them by the addition of taxes levied on them. But this treatment eliminates from GDPm an equal amount of taxes on expenditure, since C + I + X − M − Tm gives the same value as C + I − Tm + X − M. The latter formula makes it clear that the new definition of GDPm undervalues what is actually paid for GDPm by the amount of Tm. *Sources and Methods*, as quoted above, argues that imports should be valued to include taxes on them, since taxes are included in the prices paid for them. One can agree that the valuation of imports at market prices should include taxes levied on them, but it is relevant to observe that imports and Tm have already been included in the formula in C + I + X, and that to include Tm again with negative sign appears to produce the opposite result to that intended by the official statisticians, that is the exclusion instead of inclusion of taxes falling on imports.

On the official equation GDPm = C + I + X − M, with M valued

to include taxes levied on imports, Nicholson remarks that the equation will not hold good " unless customs duties are included in the value of imports " because " the gross domestic product will be shown as rising (falling) whenever we import more (less) of the goods that attract customs duties, even though the output of every domestic industry is unchanged."[1] The truth of this proposition is not self-evident. What is being discussed is the value of gross domestic product at market prices, and market prices, in national economic accounting at any rate, include the total of taxes on expenditure net of subsidies. The value of GDPm is a function of quantity and price. If prices rise, for any reason, so long as output does not fall by an amount offsetting the increase in prices, GDPm must increase. For example, assume that the output of every domestic industry remains unchanged, that the levels of exports and imports remain unchanged, but that tax rates on home-produced goods are increased. Will the value of GDPm increase? The answer is " Yes," by the amount of the increase in Te − Tn. This increase will be shown as an increase in C + I, causing an equal increase in GDPm. With the same assumptions, except that the increase in taxes falls on imports instead of home-produced goods, will GDPm increase? C + I will rise by the amount of the increase in Te − Tn and, since we are measuring GDP at market prices, it seems reasonable to think that GDPm should rise by the same amount. But with the official treatment, −Tm will rise by the same amount as the increase in Te − Tn, so that GDPm remains unchanged. But was the second case so different from the first case as to warrant this different treatment? That " No " is a reasonable answer may be apparent from a final example.

Assume that the output of every domestic industry remains unchanged, costs of production remain unchanged, but that changes in consumption demand cause a change in the composition of imports so that their value with taxes increases but their cost to the United Kingdom remains unchanged. What should happen to GDPm? C + I will rise by the amount of the increase in Te (because of, and equal to, the rise in Tm), but with the official definition of GDPm the rise in C + I will not be reflected in an equal rise in GDPm, because of the equal rise in −Tm. Now this seems to be unreasonable. The increase in Tm is not due to either an increase in tax rates or to an increase in the volume of imports, it is solely due to a shift in consumption. The significance of the shift in consumption, on our assumptions, is that it indicates that a higher price will be paid for a different collection of imports which cost the nation no more than the former collection of imports. It appears reasonable to think that the higher price paid in the form of taxes should be reflected in GDPm. An alternative way of presenting the argument is that the new import earnings (the new collection of imports) of a given volume and value of exports are valued more highly by the importing nation than the previous import earnings

[1] *Loc. cit.*, ECONOMIC JOURNAL, p. 223.

(the old collection of imports). If this is a reasonable view of the situation, then the higher valuation of the new collection of imports should be included in GDPm, and GDPm should be defined as C + I + X − M and not as C + I + X − M − Tm.

IV

Though the argument is now completed, this final section may be of interest. The Central Statistical Office has very kindly supplied me with estimates of taxes on expenditure levied on imports (or on withdrawals from Bond). These are as below:

Year . . .	1948	1949	1950	1951	1952	1953	1954	1955	1956
Tm (£ million) .	826	811	871	996	1,017	1,049	1,092	1,134	1,182

It will be observed that the estimate for 1948 is different from the estimate of £801 million in Table III. The Central Statistical Office writes that this discrepancy arises from the fact that the series of figures above " relate

TABLE IV

Derivation of GDPm, GNPm, GNPf and GDPf with Current United Kingdom Practice

(£ million) *

	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.
(C) . . .	10,808	11,419	12,508	13,480	14,301	15,106	15,983	16,891
+ (I) . .	1,648	1,490	2,468	2,164	2,493	2,625	3,155	3,288
+ (X) . .	2,305	2,785	3,470	3,604	3,397	3,608	3,925	4,366
− (M) . .	−2,410	−2,809	−4,066	−3,531	−3,442	−3,596	−4,140	−4,268
− (Tm) . .	− 811	− 871	− 996	−1,017	−1,049	−1,092	−1,134	−1,182
GDPm . .	11,540	12,014	13,384	14,700	15,700	16,651	17,789	19,095
+ (Xi − Mi) .	162	337	217	93	163	225	160	178
+ (Tm) . .	811	871	996	1,017	1,049	1,092	1,134	1,182
GNPm . .	12,513	13,222	14,597	15,810	16,912	17,968	19,083	20,455
− (Te) . .	−1,981	−2,060	−2,272	−2,228	−2,375	−2,485	−2,626	−2,822
+ (Tn) . .	525	474	468	418	364	423	346	369
GNPf . .	11,057	11,636	12,793	13,940	14,901	15,906	16,803	18,002
− (Xi − Mi) .	− 162	− 337	− 217	− 93	− 163	− 225	− 160	− 178
GDPf . .	10,895	11,299	12,576	13,847	14,738	15,681	16,643	17,824
+ (Te − Tm) .	1,170	1,189	1,276	1,271	1,326	1,393	1,492	1,640
− (Tn) . .	− 525	− 474	− 468	− 418	− 364	− 423	− 346	− 369
GDPm . .	11,540	12,014	13,384	14,700	15,700	16,651	17,789	19,095

* Sources: 1949 and 1950 estimates from 1956 *Blue Book*, and estimate for 1951–1956 from the Preliminary Estimates White Paper, April 1957.
Estimates of Tm obtained from the Central Statistical Office.

to customs duties paid on imports arriving in the country—that is the Trade and Navigation figures for imports. The figure for 1948 given in the *Blue Book* [1]. . . purports to relate to the customs duties payable on imports paid for in 1948—that is the Balance of Payment figures. The adjustments we made to the 1948 figures to get them on to a payments basis is very rough and we do not know what the adjustment would be for other years."

Accepting the above series of figures at their face value, the estimates for GDPm, with the official formula, are as in Table IV.

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[1] The estimate of Tm for 1948 is not given in the *Blue Book*—it has to be derived as in Table III.

DEPRECIATION, REPLACEMENT AND GROWTH—AND FLUCTUATIONS

In a note published in this JOURNAL in 1955 Professor Neisser demonstrated that the state of steady exponential growth derived in my gross growth model was merely a special case and that the relevant equation had other roots besides the one resulting in steady growth.[1] He did not, however, determine whether the general solution would converge to exponential growth with the passage of time when the longevity of capital exceeded three.

My special solution was not incorrect because I assumed that the same rate of growth had existed for the preceding m years.[2] But it is a restrictive assumption, and it is certainly interesting to explore the general case not bound by any special initial conditions. For the sake of completeness I shall present the whole proof. The following symbols will be used (in order of appearance):

P, annual gross national product;
t, time in years;
G, annual gross investment;
R, annual replacement expenditures;
v, gross capital coefficient;
m, life span of capital assets in years;
β, gross propensity to save $= G/P$;
$a = \beta/v$;
ρ, root of the equation;
u, the modulus of the complex root;
θ, the amplitude of the complex root.

Expressed in finite differences (which are more appropriate for our present purposes), the original equation of my paper (7) can take the form of

$$P_t - P_{t-1} = \frac{G_{t-1} - R_{t-1}}{v} \tag{1}$$[3]

and since $R_t = G_{t-m}$, and $G_t = \beta P_t$,

[1] Hans Neisser, "Depreciation, Replacement and Regular Growth," this JOURNAL, Vol. LXV (March 1955), pp. 159–61. The gross growth model in question was presented in "Depreciation, Replacement and Growth," this JOURNAL, Vol. LXIII (March 1953), pp. 1–32, to be referred to as the Article; the latter was reprinted in my *Essays in the Theory of Economic Growth* (New York, 1957), pp. 154–94, to be referred to as the Book.

I am grateful to Professor Robert M. Solow for helpful comments on this note.

There is an error in equation (9), p. 20 of the Article, p. 176 of the Book. Its correct form is $r = \left(\frac{\alpha}{v} + \frac{1-\alpha}{m}\right)\left[1 = \frac{1}{(1+r)^m}\right]$.

[2] The Article, pp. 14–15; the Book, p. 169.

[3] The Article, p. 15; the Book, p. 170. Another alternative would be $P_t - P_{t-1} = \frac{G_t - R_t}{v}$. The form used above in the text seems to be more sensible.

$$P_t - P_{t-1} = \frac{\beta}{v}(P_{t-1} - P_{t-m-1}) \tag{2}$$

For convenience, let $\frac{\beta}{v} = a$. Then

$$P_t - (1 + a)P_{t-1} + aP_{t-m-1} = 0 \tag{3}$$

with the characteristic equation

$$x^{m+1} - (1 + a)x^m + a = 0 \tag{4}$$

By Descartes' rule of signs ($a \geqslant 0$) there are two positive roots. One of them, $\rho_1 = 1$. Its elimination gives the reduced form of (4)

$$x^m - a(x^{m-1} + x^{m-2} + \ldots + 1) = 0 \tag{5}$$

If $x = 1$, $a = 1/m$, and it is clear from the nature of the problem that if

$$\begin{aligned} a &> \frac{1}{m}, & \rho_2 &> 1 \\ a &= \frac{1}{m}, & \rho_2 &= 1 \\ a &< \frac{1}{m}, & \rho_2 &< 1 \end{aligned} \tag{6}$$

It can also be easily shown that $\rho_2 \leqslant 1 + a$. ρ_2 is the root (reduced by 1 of course) which was *the* solution of my original equation and which produces growth when $a > 1/m$.

When m is even (4) has one negative root, ρ_3, but since $f(0) = a$ and $f(-1) = -2$ in (4), $|\rho_3| < 1$.

Expression (4) will also have complex roots when $m \geqslant 3$. The following proof, worked out by Professor Bancroft H. Brown of the Department of Mathematics, Dartmouth College (in the summer of 1955), shows that the modulus of every complex root must be less than 1. At my request Professor Brown stressed simplicity rather than elegance.[1]

By taking the derivative of (4) it can be shown that (4) has no multiple roots except for the already found $\rho_1 = \rho_2 = 1$ when $a = 1/m$ (and the trivial case $x = 0$ when $a = 0$).

For any given m and a very small a, all complex roots cluster around the origin (they all equal zero when $a = 0$). We shall show that no complex root can lie on or beyond the unit circle. Let the complex root be

$$u(\cos\theta + i\sin\theta) \tag{7}$$

Substitute (7) into (4):

$$u^{m+1}[\cos(m + 1)\theta + i\sin(m + 1)\theta] - (1 + a)u^m(\cos m\theta + i\sin m\theta) + a \equiv 0 \tag{8}$$

[1] For a more general but less simple proof see Robert M. Solow, "A Note on Dynamic Multipliers," *Econometrica*, Vol. XIX (July 1951), pp. 306–16.

Since (8) is an identity in θ and u, its real and imaginary parts must be separately equal to zero. Hence,

$$u^{m+1}\cos(m+1)\theta = (1+a)u^m\cos m\theta - a \tag{9}$$

$$u^{m+1}\sin(m+1)\theta = (1+a)u^m\sin m\theta \tag{10}$$

Square and add:

$$u^{2(m+1)} = (1+a)^2u^{2m} - 2a(1+a)u^m\cos m\theta + a^2 \tag{11}$$

Suppose now that a complex root is on the unit circle, so that $u = 1$. Then (after a few simplifications),

$$2a(1+a)(1-\cos m\theta) = 0 \tag{12}$$

and

$$\cos m\theta = 1 \tag{13}$$

Hence,

$$m\theta = 2c_1\pi \tag{14}$$

where c_1 is an arbitrary integer.

Also, from (9), with $u = 1$,

$$\cos(m+1)\theta = (1+a)\cos m\theta - a \tag{15}$$

but since $\cos m\theta = 1$ by (13),

$$\cos(m+1)\theta = 1 \tag{16}$$

$$(m+1)\theta = 2c_2\pi \tag{17}$$

where c_2 is also an arbitrary integer.

From (14) and (17),

$$\theta = 2\pi(c_2 - c_1) \tag{18}$$

As $\sin\theta = 0$ by (18), the only place on the unit circle which the complex roots can reach is 1. But this is impossible because equation (4) has no other roots at 1 except ρ_1 and possibly ρ_2 (when $a = 1/m$). And since all roots are continuous functions of a (for any given m), they cannot penetrate beyond the unit circle. Therefore the modulus of every complex root is less than 1.

The general solution of the equations (2) or (3) is

$$P = k_1 + k_2\rho_2^t + k_3\rho_3^t + \ldots + k_{m+1}\rho_{m+1}^t, \tag{19}$$

where the ks are constants, $\rho_1 = 1$, ρ_2 is the positive root resulting in growth (when $a > 1/m$ and $\rho_2 > 1$), ρ_3 is negative when m is even, but $|\rho_3| < 1$, and all other roots are complex, with absolute values less than 1. In the general case, P_t is subject to fluctuations, but they will die down as t increases, and P_t will asymptotically approach an exponential rate of growth when $\rho_2 > 1$ irrespective of any special initial conditions. If the latter happen to exhibit

a constant rate of growth for m periods, all coefficients except for k_2 will vanish, and P_t will grow exponentially from the very beginning as shown in my paper.[1]

There is something puzzling about the solution (19). Since this puzzle is not concerned with the complex roots let us omit them and rewrite (19) as

$$P_t = k_1 + k_2\rho_2^t + k_3\rho_3^t \tag{20}$$

Now suppose that $a = 1/m$. Then $\rho_2 = 1$, and P_t should show no growth at all, the gross propensity to save (β) being just sufficient for replacement. But according to the well known rule, when $\rho_1 = \rho_2 = 1$, P_t becomes

$$P_t = k_1 + k_2 t + k_3\rho_3^t, \tag{21}$$

i.e., the absolute rate of growth of P_t will approach a constant. Or suppose that $a = 0$, *i.e.*, assets are not replaced at all. P_t should gradually decline to zero, but in (20) $\rho_2 = \rho_3 = 0$, and

$$P_t = k_1, \tag{22}$$

i.e., P_t becomes a constant.

P_t behaves in this strange manner because the mathematical expression of our problem as given in (1) (or in (2) or (3)) is not inconsistent with the presence in the model of some constant permanent asset which yields output and which need never be replaced.[2] Thus if $P_t = F(t) + h$, and hence $P_{t-1} = F(t-1) + h$, where h is such a constant, then $P_t - P_{t-1} = F(t) - F(t-1)$, as in (1). On the other hand, the difference equation corresponding to the reduced characteristic equation (5)

$$P_t = a(P_{t-1} + P_{t-2} + \ldots + P_{t-m}) \tag{23}$$

is free from such a constant; it expresses the economic intent of the model better than (1), but it is based on a stricter assumption than (1), and hence is less general. The presence of an extraneous root is not unusual in solutions of difference or differential equations, and its coefficient can be eliminated by a proper choice of initial conditions. In our case the presence of $m + 1$ arbitrary initial conditions will not, as a rule, eliminate this coefficient. But if there are only m initial arbitrary conditions, that is, if output of to-day is a function of investments of the preceding m years and of no other assets, then the $m + 1$ condition is derived from (23), and $k_1 = 0$ in (20) and $k_2 = 0$ in (21). While I did not intend to have a permanent asset in this model, it may perform a useful role in others, indicating the presence of land, financial investments, and so on.

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[1] The reason why m rather than $m + 1$ initial conditions are required is explained below.

[2] This asset can be negative as well—a debt, for instance.

ODDS, POSSIBILITY AND PLAUSIBILITY IN SHACKLE'S THEORY OF DECISION

I WISH to consider Shackle's "focus-value" method[1] of appraisal of a particular venture in a decision situation in the light of the following example. A person (the speculator) is offered a choice between the following two gambles on a roulette wheel:

	Prizes (in units of £1,000).			
Gamble.	No. 1.	Nos. 2–18.	Nos. 19–35.	No. 36.
A	−10	−1	+19	+20
B	− 9	−8	+ 1	+22

This situation is supposed to be a representation of an entrepreneur's decision problem, and I am making the assumption that such a representation can be used to illustrate Shackle's theory. The gambles A and B represent two different types of investment, the numbers 1 to 36 on the roulette wheel correspond to 36 mutually exclusive and exhaustive hypotheses regarding the possible outcomes of either venture, and the prizes (positive or negative) correspond to the face-values of the various hypotheses.

Let us first of all appraise gamble A. Each of the 36 possible outcomes has the same potential surprise. The focus values are therefore clearly 20 units focus gain and 10 units focus loss. Comparing this with the pair of focus values in gamble B, we are forced to conclude that B is a "better" gamble than A. According to Shackle's theory—or rather my interpretation of it—there is no escaping this conclusion. And yet this is surely contrary to common sense. Almost everybody would be glad to accept gamble A played for small stakes (say units of £1) and refuse gamble B played for any stakes, small or large. The source of the contradiction is, of course, the fact that the speculator lumps outcomes Nos. 19–35 together (in, say, situation A) to form a composite hypothesis whose plausibility is considerably greater than hypothesis No. 36. The "vividness" of the composite hypothesis that one of the numbers 19–35 will turn up, *i.e.*, the value of the ϕ-function, is greater than the value of ϕ for the hypothesis that No. 36 will turn up; and this is so by virtue of the considerably greater plausibility of the composite hypothesis.

Now if I have understood Shackle's theory correctly, one must attach zero potential surprise to each of the 36 hypotheses about a particular

[1] *Expectation in Economics*, Cambridge, 1949, second edition 1952.

number turning up, since potential surprise of a hypothesis is independent of the number or plausibility of its rival hypotheses. Shackle states clearly and with emphasis that different mutually exclusive hypotheses cannot be integrated " to form a strong team " so long as each individual hypothesis has a lower ϕ-value than one particular hypothesis—in this case, the one corresponding to No. 36. I conclude from the above counter example that either:

(*a*) Shackle's theory is not concerned with this type of decision-problem, but only with the particular brand of problem that confronts entrepreneurs; or

(*b*) his theory is not valid in general, and requires modification so that in appraising a possible action the speculator surveys, not only the set of mutually exclusive simple hypotheses, but also the set of composite hypotheses (which are not mutually exclusive) formed by the disjunction of subsets of the set of simple hypotheses; such a modification would of course destroy the simplicity of the present theory; or

(*c*) I am misinterpreting Shackle's theory; or

(*d*) gamble B is in fact better than gamble A; I refuse to believe this.

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SOME REFLECTIONS ON MR. GOULD'S ARTICLE

Mr. Gould's luminous and generously-worded criticism seems to me extremely valuable in enabling some of the difficulties which a theory of decision under uncertainty presents to be exactly pinned down.

I think the core of the question is psychological. First, does the uncertainty which faces the business-man present itself to him, or is its essential nature such as to allow it to be formulated, as a clear-cut matter of the counting of cases? And secondly, if counting of cases does seem meaningful, where does that point lie at which unfavourable odds takes on the meaning, in an instance where the large scale of the ventures in question makes the occasion a manifestly unique or rare one, of lessened *possibility*? For it is possibility, the question of what *can* happen, I would still maintain, that is relevant in isolated occasions of deciding.

Nevertheless, I am bound to admit that if the odds are long enough, lack of probability must somewhere merge, psychologically, into lack of possibility, as no doubt it does in Mr. Gould's example. There, as he suggests, the speculator might attach higher potential surprise to gamble A's +19

prize than to its +20 prize, or to gamble B's +22 prize. Whether, if the experiment were truly and strictly unique, he would be justified, is a question that Charles Peirce himself left unanswered. The chief inference to be drawn is the importance of following up Mr. Gould's suggestion of constructing a modified theory where "in appraising a possible action the speculator surveys not only the set of mutually exclusive simple hypotheses, but also the set of composite hypotheses (which are not mutually exclusive) formed by the disjunction of subsets of the set of simple hypotheses."

All these questions, however, arise only when we have answered or agreed to leave aside the first question; Can we regard the raw material out of which the business-man constructs his expectations as lending itself to formulation in terms of odds? Mr. Gould has himself given prominence to this prior question, which he and I have referred to in correspondence as "escape route (*a*)" from his criticisms. Some critics, in particular Mr. J. de V. Graaff, have urged on me the view that it is the *kind* of uncertainty which envelopes the business-man's decisions, the confusion and fog, as Professor Carter has called it, of conflicting indications, the difficulty of interpreting his raw material, that I ought to lay stress on, and not the uniqueness of the experiment he makes. However, I think both are true.

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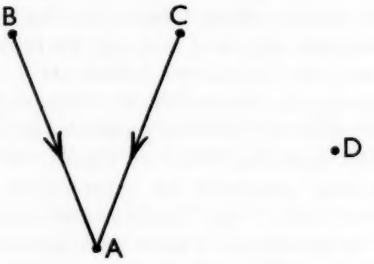
ODDS, POSSIBILITY AND PLAUSIBILITY: A FURTHER EXAMINATION

I agree with Professor Shackle that it is necessary to make a distinction between situations where the uncertainties involved can be described completely in terms of classical probability, and those where the uncertainties are of a vague non-numerical nature. For the sake of convenience I will call the former class of situations gambles.

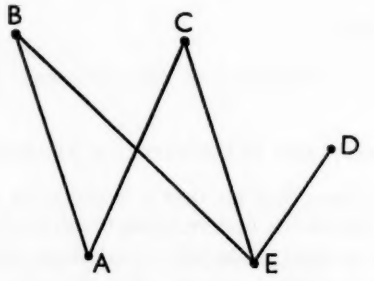
These two types of situation require completely different analyses. The gambling situation, even for a unique non-seriable trial, is more or less adequately dealt with by the von Neumann–Morgenstern theory of utility. (I shall have more to say about this presently.) But since this theory is based on the assumption that all the uncertainties can be represented by a numerical probability, it seems to me that it is entirely inadequate for dealing with situations where the uncertainties are vague and non-numerical. It is in this sort of situation that Shackle's theories are applicable. Thus "escape route (*a*)" seems to me more valid than ever. I cannot, in fact, quote my example based on classical probability as a counter-example to his theory unless he insists that his theory is intended to cover gambling situations. Let us look into potential surprise more closely.

In the realm of vague non-numerical uncertainty the potential surprises

form a partially-ordered set. Suppose, for example, there are four hypotheses A, B, C, D. The potential surprises may be partially ordered according to the following diagram:



Here A is more possible than B and also more possible than C, but no other pairs can be compared as to their degree of possibility. Now it is not difficult to find a realisation of this model for which the hypothesis E defined as " B or C or D " can be fitted in the diagram as shown below:



In this case, A and E remain incomparable, even though E is more plausible than D, which by itself is incomparable with A. In such situations, and I imagine that entrepreneur problems are typical of them, composite hypotheses (such as E) may carry no further weight than their individual components. There is in this type of situation no ground for contradicting Shackle's focus-value method of solution.

I should now like to strengthen my case that Shackle's theory is limited to the " non-gambling " type of situation by taking him up on a point made in his book. He says in essence that in a non-seriable, non-divisible trial probabilities based on frequency are utterly irrelevant. I disagree with him, because in my opinion I can find a very good reason for considering probabilities in such situations.

It is well known in the theory of animal behaviour that frequently occurring similar situations set up a conditioning. If a situation is invariably

repeated it can set up an invariable response in the animal (*i.e.*, the conditioned reflex). For human beings, the process is similar but more sophisticated. If A is followed by B $100p\%$ of the time, the conditioning creates an attitude of mind towards B on observing that A has happened. We can look on this attitude of mind in two ways, (*a*) as a psychological state, (*b*) as a disposition to behave in a certain way. What determines a person's behaviour in the face of the uncertain prospect of B, knowing A has happened, can be expressed in terms of either (*a*) or (*b*), but has nothing to do with anything else. Since (*a*) and (*b*) are determined largely by relative frequencies (corresponding to a classical probability p), how can Shackle say that frequency considerations are irrelevant? Consider the following example:

I offer Mr. Smith a choice of two gambles. Either I toss a coin and he receives £80 if he calls correctly (Gamble X), or I throw a die and he receives £100 if he calls the correct number showing face up (Gamble Y). Suppose he chooses gamble Y. How am I to judge the stupidity of this action? Clearly it is nonsense to judge a unique experiment by results. What criteria are left? Putting myself in Mr. Smith's shoes, I can say (at one level) that I have an attitude of mind which points to the implausibility of my winning £100. Since £80 is a *much more plausible* win and £80 is not proportionately less than £100, I choose X. If I want to interpret this statement at a behaviouristic level, I must say the following: "A combination of past experience with dice and coins, and analogical inference, has produced in me the tendency to act on the assumption that I may guess the fall of a coin but that I will definitely go wrong if a die is thrown. In choosing gamble X I would be exercising a natural disposition; this disposition is a biological necessity. In condemning Mr. Smith's behaviour as stupid, I am saying that either his conditioning is eccentric or he has failed to draw the proper inferences from his experience (*i.e.*, his conditioning)."

I think that maybe it is only from this point of view we can talk about "rationality" or "stupidity" of a person's behaviour in the face of risk. It is in more complex situations, where our experience provides no simple guide to the nature of the uncertainties and where there is the added complication of a wide range of face-values attached to various hypotheses, that an analysis such as Shackle has given in his book is invaluable as a guide to behaviour.

I should like as a sort of postscript to make a remark about the von Neumann–Morgenstern theory of utility. As I said earlier, that is only applicable to situations where numerical probability can be used. Even in this narrow context, the principle of maximisation of expected utility is merely a criterion for consistency of behaviour within a family of situations. The theory says nothing about *a priori* behaviour, nor is it meant to. This point is explained very well by Savage in his *Foundations of Statistics*.[1]

[1] L. J. Savage, *Foundations of Statistics*, New York, 1954.

Shackle's focus-value approach, apart from its different domain of applicability, is concerned much more with *a priori* behaviour. Arrow in *Econometrica*,[1] in his review of the theories of behaviour in the face of risk, compares Shackle's theory with the von Neumann theory as though they were dealing with the same problem. This is only true from a very broad point of view, and his comparison is therefore misleading. What is missing in the general field of inquiry is a theory whose domain is the no-man's land between numerical probability and non-ordered non-measurable potential surprise.

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FURTHER NOTE

Mr. Gould's further pages leave me with no desire to do other than express admiration for an incisive and commanding argument. Decision-making is, perhaps, of all problems that the human sciences have thrown up, the richest and most central. I am sure that it is along such paths as Mr. Gould has indicated that progress must be sought.

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[1] Kenneth J. Arrow, " Alternative Approaches to a Theory of Choice in Risk-taking Situations," *Econometrica*, Vol. 19, 1951, pp. 404–37.

BRITISH–CANADIAN INDUSTRIAL PRODUCTIVITY[1]

THE empirical study of international differences in the productivity of individual industries has not been pursued at all widely since the major work of Dr. Rostas was published in 1948,[2] and for studies covering many industries it remains almost alone in the field.[3] Principally this has been due to the inherent difficulties of measurement, and therefore to the discouraging unreliability of results, but also because post-war interest has been largely concerned—in Britain at any rate—with the United States. For the present study Canada was chosen. It is a country in which output, in contrast to the United States, is considerably smaller than in Britain, in which much British equipment is used, and in which statistics are highly developed (although this aids measurement for the comparison it does not solve all the problems involved). The aim is not only to present (in Part I) the results of an empirical study of British–Canadian industrial productivity in 1948, and to examine some related data on costs and prices, but also (in Part II) to suggest when and how the observed differences may have arisen.

To avoid confusion, productivity will mean the use of various factors, taken singly or collectively, per unit of output; a high productivity will therefore refer to a low use. In Part I, four of these factors will be examined; the first three are the principal variable inputs, labour, materials and fuel, and the fourth input is fixed capital, together with a special aspect of it, mechanisation.

PART I. PRODUCTIVITY, COST AND PRICE STATISTICS, 1948

Because the method of measurement chosen may in some degree influence the results, it is relevant to remark on the procedure adopted.

[1] I would like to thank the administrators of the Conditional Aid Programme for having financed the project. My thanks are also due to Mr. W. B. Reddaway, Director of the Department of Applied Economics in the University of Cambridge, for guidance and assistance throughout the study, and to Professor E. Devons, Mr. E. Osborn, Dr. W. E. G. Salter, Dr. S. J. Prais and the late Mr. A. A. Adams for their helpful comments and suggestions. Various trade and other organisations, in particular the Canadian Dominion Bureau of Statistics, gave valuable assistance, for which I am most grateful. The broad debt to Dr. Rostas, on whose initiative this project and many others in the field were started, is also gratefully acknowledged. Errors and confusions which remain are, of course, my own responsibility.

[2] L. Rostas, *Comparative Productivity in British and American Industry* (Cambridge, 1948).

[3] But see M. Frankel, "Anglo-American Productivity Differences: Their Magnitude and Some Causes," *American Economic Review*, May 1955, also *Produktivität und Produktivitätsmessung im nationalen und internationalen Vergleich*, by Günther Burgardt (Verkehrs- und Wirtschafts- Verlag G.M.B.H., Dortmund, 1954), which compares the post-war productivity of labour and some other factors in the iron and steel industries, iron-ore mining, coal, and agriculture between the United States of America and several European countries, including the United Kingdom.

Throughout the paper, interest is directed towards technological productivity, that is towards the way in which industries operate (but since economic and not engineering data form the basis of the study, " technological " must not be interpreted too narrowly). No attention is given to the welfare aspects of productivity differences. For this approach a global study may be misleading, since one needs to compare only industries which are using similar materials in the same stage of fabrication to produce similar products; with this restriction, the approach in measuring output was close to that described elsewhere by Miss Paige and Mr. Adler.[1] A brief outline may nevertheless be useful.

The method used to compare production between each industry in the two countries consisted essentially in taking the output of commodities from the Census of Production in physical units—tons, gallons, etc.—and assuming that a unit of the specified commodity produced in Britain was equal to a similar unit in Canada. Since the commodity may itself comprise many articles, *e.g.*, alloy steel castings, the assumption is hazardous, and if untrue may falsify the whole basis of the comparison. By examining the materials used it was sometimes possible to detect the absence of close comparability in output quality, as in the case of " brewing and malting," where the strength of beer was different in the two countries,[2] but usually there was little data with which to test the assumption.

Since all the industries produced more than one commodity, there was the further problem of adding quantities of different goods together to derive total output for each industry. The traditional method was used of combining by value on the basis, first, of the prices prevailing in Britain, and then of the prices in Canada, the price in each case being the average value from the Census. Although the two answers which this gave were sometimes different, they were not averaged, since this did not appear to make them more useful.

The assumption behind this is that the prices within each industry are transformation rates reflecting very broadly the quantity of resources of all kinds (including entrepreneurship) used to produce the various units of output in that industry. Of course, price is affected also by demand, monopoly position, official directives, etc., while some Census prices are mere book-keeping entries recording transactions between different sections of the same firm, so that no precise relationship can be expected. It is sufficient, however, if *relative* prices within each industry are broadly correct in representing the relative quantities of resources.

It is important to note that if commodities are produced in the same proportions (measured by quantity) in a particular industry in the two

[1] D. Paige and S. Adler, " International Comparisons of Real Product: an approach by Industry of Origin," *Income and Wealth*, Series IV (1955).

[2] The principal product, beer, was recorded in the Census in gallons; the quantity of materials input per unit of output was probably at least 50% higher in Canada than in Britain.

countries, then the price/transformation rate assumption is unnecessary, since the computed output ratios would be the same whatever prices were used to combine quantities.[1] If, on the contrary, the proportions are very different, the comparison is probably of little use, since the processes[2] may be different; it is therefore in intermediate cases that the truth of the assumption is of greatest importance, although where to draw the line between worthless studies (from the technological view) and those which may be of value (assuming valid transformation rates) requires empirical judgment and cannot be determined *a priori*.

An example may be quoted of the "paper and board" industry, in which, in 1948, newsprint comprised 73% of Canadian output; Britain specialised in higher-grade esparto, woodfree and rag papers, and devoted only 10% to newsprint. In this case one would have to rely heavily on the price/transformation rate assumption in computing relative output, and since newsprint is a product apart from other papers (it is made from a different combination of materials having different properties, and is generally manufactured on a special machine), one would be unwise to make such an assumption. There is no alternative[3] but to exclude this industry from the comparison.

To measure the quantity of materials and fuel was essentially similar, the various commodities being combined on the basis both of British and Canadian prices,[4] and the assumption made that quality was equal. Where the proportions of the various materials were very different, this indicated not only that the materials/output ratios were probably useless for a study of this nature, but also that the comparison of any other factor with output might be invalidated because the required "amount" of conversion from material to product may differ.

Fuel was treated as conceptually different from materials, and was viewed simply as an aid in converting materials to output; differences in

[1] But if the two answers obtained by taking the two prices in turn are about the same this may not mean that the comparison is reliable, since this may have come about because of similar price ratios.

[2] Taken by itself the use of a different machine or process is no reason for exclusion from this study. If the same materials produce the same output in the two countries by a different method, this is a perfectly admissible technological difference. But if different materials are used to produce the same output (*e.g.*, hydro- and thermal-electricity), then for present purposes the comparison is of little use.

[3] But if one is concerned only with labour productivity, and if one could obtain the unit labour content for each grade of paper in one country, it would then be possible to calculate quite simply relative labour productivity for the industry as a whole between the two countries without using prices at all (by comparing the actual labour required in one country to produce a given total output of commodities with the labour which would be required to produce the same quantities of goods if the unit labour content of each commodity was that of the other country). It might then be possible to include this industry in at least certain parts of the present comparison.

[4] Since materials and fuel are purchased from many industries, the price/transformation rate assumption may be less realistic than with output which emanates from one industry. Also a greater part of total value remains uncovered by quantity data than in the case of output, and a greater reliance is placed on the validity of the assumptions one makes about this (see Appendix A).

the proportions in which fuel was used did not therefore invalidate the comparison, although this placed considerable reliance on the price/transformation rate assumption. (Fuel use was also estimated in British Thermal Units.)

Altogether, out of twenty-three industries examined closely, nine were rejected from this study, principally for reasons of major structural difference in either output or materials input, but including some where the statistics were presented in such a way that uncertainty was felt about their comparability.[1] It must be admitted that those which remain are not perfectly comparable, but if the study is to be made at all a small degree of tolerance must be permitted.

When measuring labour input, the simplest approach is to compare numbers employed, but here some allowance was made for the differing proportions of males and females (on the basis of average earnings), although no adjustment for differing skills was possible (which in any case was probably small), nor for differences in effort. It was considered more logical to take total employment rather than operatives alone as the principal labour input, since both groups of workers are essential to the production process, but estimates were also made of operative hours.

Finally, it may be noted that most previous international productivity comparisons have concentrated on labour as the principal input; the emphasis here is on the total utilisation of factors. In particular, the analysis has ventured into the field of international costs and prices in order to help explain reasons for the results obtained. It is hoped that by thus broadening the comparison it will become more meaningful.

Labour Input per Unit of Output

In Table I, as elsewhere, the figures are percentages for Canada with Britain as 100. It shows the relative total employment per unit of output for those industries in which the commodity structure of both output and materials was not widely different between the two countries, and the relative operative hours per unit of output. In every industry it appears that in 1948 Canada needed fewer employees and operative hours per unit of output than Britain, *i.e.*, her labour productivity was higher.

[1] In addition to the *Paper and Board* and *Brewing and Malting* industries which have already been mentioned (in both of which there were also serious statistical difficulties in making a comparison), the following were examined in detail and similarly rejected from this study: *Cordage, rope and twine* (there were wide differences in the commodity structure both of materials input and output): *Cattle and poultry feed* (inadequate quantity data was available about materials used): *Manufactured gas* (the Canadian industry was very small and highly specialised since nearly half of the gas was "sold" to an associated chemical works): *Preserved fruit and canning* (structure of products was widely different, particularly between jam and fruit canning): *Woollen textiles* (in Canada 62% of worsted yarn (intermediate product) was sold to the hosiery trade, which was replaced by imported yarn of different quality to make final products): *Bread and other Bakery products* (insufficient data about output, and materials not comparable): *Dairy products and Ice cream* (statistical differences in coverage).

Differences between the total employment and operative hour figures arise because in almost every industry examined Canadian operatives worked fewer hours per week than their British counterparts, and in only two out of the fourteen comparable industries (soap and coke ovens) did Canadian operatives occupy a significantly lower proportion of total employment than the British. (But it is difficult to be certain about the accuracy of the latter result, since there were slight differences in classification between administrative personnel and operatives in the two countries.)

What do these figures imply? Labour productivity indices show

TABLE I

British–Canadian 1948 Labour Productivity[a]

(All indices are for Canada: Great Britain = 100)

	(A) Relative employment per unit of output.		(B) Relative operative hours per unit of output.	
	(*b*)	(*c*)	(*b*)	(*c*)
Petroleum refining	46	42	43	40
Cotton spinning and weaving	53	51	52	50
Biscuits	56	57	69	70
Cement (not quarries)	57	59	59	58
Confectionery	60	58	69	69
Blast furnaces, iron and steel melting and rolling	60	60	60	60
Tobacco	65	75	71	86
Clothing	65	68	59	63
Soap, glycerine, candles	66	69	58	62
Rubber	67	81	63	77
Iron foundries, tubes	69	68	71	70
Sugar refining	71	70	68	68
Coke ovens	77	77	62	62
Footwear	82	83	74	75
Median	65	68	63	65
Upper quartile	70	76	70	73
Lower quartile	57	58	59	59

Sources: Compiled from Census of Production data.

(*a*) Industries are presented in order of increasing Canadian relative employment per unit of output (at British prices).
(*b*) At British prices (see text).
(*c*) At Canadian prices.

nothing positive about *labour* except that unit labour requirements were different. If labour quality, that is the effort and skill of workers and management, was identical, then the entire difference in labour productivity must be due to a whole complex of factors other than labour, like capital equipment, materials, fuel, mechanisation, integration, organisation, intensity of operation, etc. Until labour productivity statistics are brought into relation with other factors, and with changes over time, they are interesting in themselves, but cannot be explained or made useful.

Materials and Fuel per Unit of Output

Besides labour, the other principal variable inputs are materials and fuel. It may be felt that these are best brought into the comparison by subtraction to form net output, but if—and only if—the structure of materials is the same in the two countries, *i.e.*, individual commodities are used in the same proportions to produce the same structure of output, it is quite legitimate to consider materials as an input like any other, an input which, like fuel or labour, can be used wastefully or not. One frequently assumes in statistical analysis a fixed materials input–output ratio, yet in some industries, although not of course in all, it is possible to increase materials utilisation quite extensively while keeping quality constant. Indeed, a sub-committee of the Institution of Production Engineers "is convinced that the need for investigating materials economy is widespread." [1]

Table II (A) gives the empirical results. (The possibility of greater error in the estimation of the quantities of materials and fuel than of output must be recalled here.) It appears that the Canadian average use of materials and fuel together [2] was not widely different from the British, although there was variation between industries, and that Canadian fuel use, measured in two different ways, was generally below the British.

Similar arguments apply to materials utilisation as to labour; differences may be caused by the relative use of labour or capital, the degree of integration, organisation, etc., as well as by possible differences in the quality of materials [3] or fuel (as perhaps in the case of petroleum and cotton textiles).

To be more explicit, in general, care may be taken to avoid wastage of materials and fuel by employing more labour, by better organisation or by instrumentation.[4] Full use can be made of by-products; machines may work more efficiently as a result of technological change; [5] equipment

[1] "Materials Utilisation in the Metal Working Industries," Institution of Production Engineers, August 1955, p. 4. It is the intention of the sub-committee to examine materials utilisation in several industries.

[2] In some industries a clear distinction cannot be made between materials and fuel. The materials data which could have been shown separately in the above table differ hardly at all from the combined figures given. "Cement" was excluded, since it was clear from the British Census that some materials must have come from "own quarries"; as these were not purchased, no details were given.

[3] Iron ore for blast furnaces, where quality differs widely, has been included statistically as the tonnage not of ore but of iron content; this is only a partial solution, since to process the lower-grade British ore demands relatively more labour per ton of iron produced.

[4] For example, until recently many British open-hearth steel furnaces burning producer gas were still without instrumentation, with wastage through lack of precise knowledge of control conditions. G. R. Bashforth, *Journal of the Iron and Steel Institute*, May 1953, p. 56. The importance of instrumentation in coke ovens is pointed out by J. J. Bailey in the *Yearbook of Coke Oven Managers Association*, 1955, p. 360.

[5] "The new technique of shell moulding offers economies both in castings which are dimensionally more accurate, with consequently smaller machining allowances, and also in the lack of sand inclusions in the surface, which greatly improves tool life." Both materials and capital are thus saved. *Materials Utilisation Report*, p. 7.

may operate at above capacity, which often wastes materials; savings may result from better design, with effective quality constant;[1] there may be benefits from shift-working in that steam-raising plant, hence fuel, is better

TABLE II

Relative Productivity of: (A) Materials and Fuel; (B) Total Employment, Materials and Fuel Combined [a]

(All indices are for Canada: Britain = 100)

	(A)						(B)	
	Quantity of materials and fuel per unit of output.		Quantity of fuel per unit of output.				Combined quantity, of employment, materials and fuel per unit of output.	
	(*b*)	(*c*)	(*b*)	(*c*)	(*d*)	(*e*)	(*b*)	(*c*)
Petroleum refining	110	101	—	—	—	—	105	93
Cotton spinning and weaving	108	107	96	66	53	53	92	79
Biscuits	108	101	90	65	64	64	95	84
Confectionery	94	91	69	61	51	50	87	81
Blast furnaces, iron and steel	85	80	103	92	78	78	77	71
Tobacco	97	108	70	73	52	59	90	97
Clothing	105	102	—	—	—	—	91	87
Soap, glycerine, candles	94	101	96	97	92	98	90	93
Rubber	101	120	74	82	69	83	91	103
Iron foundries, tubes	88	88	90	84	61	61	80	77
Sugar refining	91	94	137	106	97	96	90	92
Coke ovens	81	81	—	—	—	—	81	81
Footwear	84	85	94	97	107	108	83	84
Median	94	101	92	83	67	71	90	84
Upper quartile	107	106	99	97	95	97	92	93
Lower quartile	86	86	72	66	53	56	81	79

Sources: Compiled from Census of Production data.

(*a*) The order of industries is the same as in Table I.
(*b*) At British prices.
(*c*) At Canadian prices.
(*d*) Fuel in British Thermal Units per unit of output at British prices.
(*e*) Fuel in British Thermal Units per unit of output at Canadian prices.

utilised. (There may also be cost saving through the substitution of a less for a more expensive material yielding identical output, although the more extreme cases have been avoided as far as possible in this study [2] because of the difficulty of estimating the precise effect on productivity.)

Fuel-utilisation data alone are more instructive.[3] In most industries

[1] In this case the commodities would not be physically identical. That product design is also important is stressed in *Materials Utilisation Report*, p. 7, which also emphasises minimum functional characteristics. See also "Cost Design," *Institute of Cost and Works Accountants*, 1956, which makes the same point.

[2] But not completely avoided. For example, in the cotton industry it is generally accepted that in the high-wage country better-quality cotton is purchased than in the low-wage country, since this demands less processing by labour, and thus reduces variable (materials plus labour) costs. See also below.

[3] In some industries there may be a bias in the data which raised the ratios in Table II. Coal stocks in British industry as a whole fell by 25% during 1948, and since the Census in general showed only fuel purchases without indication of stock changes, British use may have been underestimated.

Canada used more purchased electricity per unit of output than Britain, in many industries more oil fuel, and generally less coal and coke. The relative price of one grade against another, through costs, was an important determinant of relative use, notably with electricity.[1] Another factor was the general efficiency, both in producing heat or power and in saving labour (as, for example, between the use of fuel oil and coal).

To use more coal as against purchased electricity or oil, as in British industry generally in 1948, probably demands more labour per unit of energy produced, and may therefore lead to a lower labour productivity than with other fuels. Moreover, to use purchased electricity in manufacturing encourages the installation of direct motor drive as against a belt system from a single or a few primary units, which may reduce overall power consumption.

Variable Factors per Unit of Output

One may wish to know the combined use of labour, materials and fuel per unit of output, since they are the variable factors, but also since the combined figures will approximately remove the effect of any substitution between labour and materials (with fuel).

Since the quantities of all three inputs are expressed in value terms at constant prices, they can easily be aggregated. The ratios are given in Table II (B), which shows that Canada used a smaller amount of variable factors per unit of output than Britain.

As a slight digression, it can be shown by using data from this study that there may have been some materials/labour substitution within each industry, in response to relative advantage in price. Each pair of industries can be visualised as the same industry in two different economic environments. The price ratio of one factor to another (*e.g.*, as used here, materials to labour) may differ between the two environments. By correlating this price ratio in each industry with appropriate quantities, the existence may be discovered of any consistent relation (*e.g.*, between a relatively high price and a relatively low use) throughout all the industries. In the present case, the materials/labour price ratio was obtained by taking

[1] The table below shows the price ratio and purchased-quantity ratio per unit of output for the major fuel commodities in the ten comparable industries for which separate fuel data are available (Table II). The figures are fairly heavily weighted by the iron and steel industries. Indices are Canadian percentages, Great Britain as 100 in each case.

Purchased Fuel Used in Production:
Average of Ten Comparable Industries, 1948

	Price ratio.	Quantity ratio per unit of output.
Coal	89	37
Coke	93	74
Fuel oil	84	202
Electricity	43	214

the ratio of the relative price of materials and fuel to the relative average wage of all employees (Table III, Col. 3), both calculated using the current exchange rate. This was then correlated [1] with:

(1) relative employment per unit of output (Table I, Col. 1), which gave the answer of +0·66, and

(2) relative materials and fuel per unit of output (Table 2 (A), Col. 1), which gave the answer of −0·63.

These suggest that when the price of materials is high relative to the price of labour, (1) the use of labour is relatively great, and (2) the use of materials and fuel is relatively small.[2] Where labour is dear relative to materials greater efforts may be made to save labour per unit of output than to save materials, so as to minimise variable costs, and one suspects that as a contribution towards saving labour, the materials themselves may be of higher quality, as in the case of the cotton industry quoted above. Unfortunately in practice it is usually difficult to distinguish from the summarised statistics in Censuses of Production the quality factor in materials used.

Costs per Unit of Output, and Prices

When considering competition, one becomes interested in the effects of differences in the utilisation of resources on costs and prices. The relevant statistics are given in Table III. It shows first the relative price of materials and fuel input, and the relative earnings of labour (together with the ratio of the two); these are based on the current exchange rate. Then, by combination with the quantity data in Tables I and II, relative unit costs are shown, together with unit gross margins; and finally, the relative price of output.

It may be useful to summarise these results together with those obtained previously. It appears that in the industries examined, in 1948: (1) Canada used considerably less labour per unit of output, although with variations between industries (average 65%), but wages were consistently higher (by 60–70%), with the result that Canadian total labour costs were on the average slightly higher (9% or so) than in Britain; (2) on the average Canada used a slightly smaller quantity of materials and fuel per unit of output, and less fuel (much less fuel when based on British Thermal Units), but because their prices were lower in Canada, materials and fuel costs together were also lower (about 13%); (3) Canada had an almost consistently lower combined labour, materials and fuel use, and on the average

[1] Product moment correlation.

[2] Perhaps the main reason why the correlations are not higher is that the possibility for substitution differs for different industries. One would also expect to find, as Professor Melman has pointed out, that where materials and capital are the two most important cost inputs, and where labour is unimportant, as in petroleum refining, there would be some substitution between these two also.

the cost of these items per unit was also lower (about 7%), *i.e.*, variable costs were lower; (4) output prices [1] (at the pre-devaluation exchange rate) [2] were nevertheless about the same, though with some variations between industries; on the average they were a little higher (about 4%) in Canada; (5) unit gross margins were generally much higher in Canada than in Britain, as implied from (3) and (4).

TABLE III

Relative Prices and Costs per Unit of Output [a]

(All indices are for Canada: Great Britain = 100 (British weights throughout))

	(1) Relative prices of materials and fuel.	(2) Relative average annual earnings all employees.	(3) Materials–labour relative price ratio.	(4) Wage and salary cost per unit of output.	(5) Material and fuel cost per unit of output.	(6) Total variable cost per unit of output.	(7) Gross margins per unit of output.	(8) Relative price of output.
Petroleum refining	89	170	52	78	97	96	55	85
Cotton spinning and weaving	75	174	42	91	82	85	79	82
Biscuits	82	157	48	89	83	84	226	104
Cement (not quarries)	—	160	—	95	—	—	—	98
Confectionery	88	150	56	90	82	83	158	94
Blast furnaces, iron and steel	102	172	59	102	84	90	179	106
Tobacco	91	169	53	112	87	92	96	105
Clothing	109	163	67	105	106	106	162	118
Soap, glycerine, candles	91	174	51	113	89	93	226	119
Rubber	82	169	45	113	81	90	151	124
Iron foundries, tubes	110	169	69	115	97	105	95	103
Sugar refining	111	159	71	112	106	106	35	84
Coke ovens	108	177	62	137	88	93	213	106
Footwear	100	138	72	113	85	93	67	89
Median	91	169	56	109	87	93	151	104
Upper quartile	109	173	68	113	97	103	205	112
Lower quartile	84	158	49	91	82	86	70	87

Sources: Compiled from Census of Production data.

[a] Relative prices, hence costs, calculated at the current exchange rate. The order of industry presentation is the same as in Table I.

Capital Equipment and the Degree of Mechanisation

We now turn to consider the principal fixed factor, capital equipment. Capital measurement is an insoluble problem. The extreme heterogeneity of capital goods makes it virtually impossible even in principle, except under simplifying assumptions, for one concept to cover all the properties it would be desirable to incorporate.[3] Even so, the attainment of some more limited objective may be informative.

[1] This is an average price from the Census for all goods made for sale outside each industry, weighted by their respective quantities. In one sense this may be more representative than "list prices," since it includes the result of differential home and export pricing (as in the steel industry in Britain) and compares directly a very large part of total production. But it is influenced by different quantities of each commodity sold (the larger bulk order secures the lower unit price), and of course by quality differences. See also Appendix A for differences in the treatment of transport costs.

[2] Cf. R. G. Hawtrey, *Cross Purposes in Wage Policy*, p. 67.

[3] See Mrs. J. Robinson, *The Accumulation of Capital* (1956), p. 117. My views about capital have also been influenced by the work of Dr. W. E. G. Salter, shortly to be published, which he was kind enough to show me.

When considering causes of productivity difference the recency of equipment is important; because of technological change the more up-to-date plant and machinery will generally be the more effective in lowering the use of *all* factors, including capital. Since the present stock of equipment is the result of year-by-year purchases, it might be a fruitful approach to estimate whether more has been invested in plant and machinery in one country than in another over the past, say, ten years. To do this the real gross investment in these assets can be aggregated over the period in each country, and to remove scale differences these totals can be related to the relative outputs to-day. One needs to measure investment gross and not net, since equipment for replacement is seldom an exact replica, but usually incorporates the result of technological change during the period between the manufacture of the old and the new; the installation of equipment both for replacement and addition will therefore affect productivity.

Full data for these calculations are available by industry in Canada from 1926,[1] but the only British pre-1948 plant and machinery data cover "manufacturing and distribution" as a group from 1924 to 1938.[2] A comparison can therefore be made for the decade or so preceding 1938, which may be of value, even though this does not cover the period one would like for this study, nor is manufacturing and distribution as a group closely related to these fourteen industries.

Two methods were used to convert dollars to pounds sterling in each year: the current exchange rate and an estimated commodity exchange rate based on price indices for plant and machinery.[3] Since the wide definition of manufacturing and distribution in Britain prevented the accurate assessment of relative output in 1938, relative employment was used; it appears that Canadian real gross investment in plant and machinery aggregated 1926–38 per head of numbers employed in 1938 was about double the British over the same period, 100 : 227[4] using current exchange rates, and 100 : 212 using the estimated commodity rates. (Crude estimates "per unit of output" indicate that Canadian investment was perhaps

[1] *Public and Private Investment in Canada 1926–1951* (Dominion Bureau of Statistics, 1951), also individual industry Census of Production reports.

[2] P. Redfern, "Net Investment in Fixed Assets in the United Kingdom 1938–1953," *Journal of the Royal Statistical Society*, Series A (General), Volume 118, Part 2, 1955.

[3] It was assumed that British and Canadian equipment prices were about level in 1948. Price indices, particularly for the "iron and steel" and "iron foundries" industries in Table III suggest this, and confirmation is given in the *Report of the United Kingdom Engineering Mission* (to Canada) *1948* (H.M.S.O., 1949), p. 35. The price indices over time were taken from *Public and Private Investment in Canada 1926–1951*, Table 13, and P. Redfern, *op. cit.*, p. 171.

[4] If rates of growth of output are about the same, an alternative approach may be to compare the *annual average* investment in equipment per employee over similar periods. This condition was broadly satisfied, and the calculated ratio was also 100 : 227 on the basis of current exchange rates. But if the effect of the difference in industrial structure between the two countries is removed (*i.e.*, of the differing relative importance of the highly capitalised industries) the ratio falls to 100 : 198. This provides useful evidence that the higher aggregate investment in Canada was not due in the main to a difference in the importance of the highly capitalised industries. See Appendix A.

about 40–50% higher.) These suggest that by 1938 Canada possessed more modern plant per head than Britain. (And Canadian labour productivity was also higher; unit labour requirements in manufacturing industry as a whole were about 69% of the British in 1938; see below.)

Although British data are lacking for 1939–48, the advantage was clearly with Canada, since not only was war damage to equipment less, but her gross investment in machinery and equipment for non-war purposes declined only slightly during 1939–45 from the 1935–39 level, while Britain's was drastically reduced. Yet the War retarded British labour productivity in manufacturing only slightly relative to the Canadian, and cannot therefore explain the larger part of the observed differences in 1948. Hence the pre-1938 per head data assume some significance for the 1948 position.

This views capital equipment historically, and in a way not closely related to the industries in this study; is there no closer approach by measurement in 1948? For broad aggregates it may be permissible to indicate capital equipment by horse-power, providing industrial structure is comparable, although it is probably too hazardous to assume this industry by industry.[1]

The degree of mechanisation—the use of machine power—being a special aspect of capital equipment, may reasonably be represented by horse-power, even though it ignores some types of mechanisation, such as the business accounting machine and the fork-lift truck, which may be important factors in determining labour productivity.

[1] It may be noted that between two periods close together *changes* in horse-power installed in certain industries are correlated with changes in a valuation of the net stock of capital, although horse-power does not indicate the level of capital, except in extreme cases. Thus in Canada 1948-53 figures for as many comparable industries in this comparison as could be shown separately are given below:

	Percentage increases 1948–53 in Canadian:		Canada in 1948	
	Capital.	Horse-power.	Capital, $ million.	Horse-power, '000.
Petroleum refining	131	144	130	96
Cotton textiles	20	21	38	120
Confectionery	8	8	19	24
Iron and steel	18	52	117	381
Tobacco	26	35	6	6
Clothing	32	42	111	13
Rubber	28	25	32	114

Sources: Capital computed as indicated below from the *Annual Reports of Taxation Statistics*; horse-power from the 1953 *Census of Manufacturing Reports*.

(Capital movements were estimated as the gross book value of buildings and equipment, less depreciation, at constant prices, with a single deflator; a combined price index of non-residential building materials, and iron and non-ferrous metal products weighted according to gross expenditures on construction and equipment.)

However, when as many manufacturing industries as possible were taken, in twenty-eight groups, rather less interesting results were obtained.

Figures for relative horse-power in use per unit of output [1] and per operative, again for Canada with Britain as 100, are given in Table IV. They suggest that Canadian horse-power in use per operative was higher than in Britain, though per unit of output it was generally lower.

TABLE IV

Relative Utilisation of Horse-power [a]

(All indices are for Canada: Britain = 100)

	(1) Relative horse-power in use per unit of output (United Kingdom, 1951 horse-power; Canada, 1948 horse-power).	(2) Estimated horse-power in use per unit of output (both countries, 1948 horse-power).	(3) Estimated horse-power in use per operative (both countries, 1948 horse-power).
Petroleum refining	42	110	202
Cotton spinning and weaving	55	62	119
Biscuits	45	91	130
Confectionery	76	112	182
Blast furnaces, iron and steel	68	74	124
Tobacco	65	67	93
Clothing	47	59	104
Soap, glycerine, candles	94	104	179
Rubber	75	87	137
Iron foundries, tubes	76	94	133
Sugar refining	104	98	144
Coke ovens	88	83	134
Footwear	70	63	85
Median	70	87	133
Upper quartile	85	103	170
Lower quartile	49	64	108

Sources: Compiled from Census of Production data.

[a] For output data, British weights used throughout. Order of industries, as in Table I.

Attention is often drawn to horse-power per operative data as an explanation of productivity differences, although it is the per unit of output data which are relevant. If the same horse-power is used to produce the same unit of output in two countries, then this cannot by itself result in higher labour productivity in one country unless the horse-power in that country is used more effectively either by better organisation or by incor-

[1] Two figures are given for horse-power in use per unit of output. Column (1) gives the ratio using United Kingdom horse-power from the 1951 Census of Production compared with Canadian figures from their 1948 Census; Column (2) uses estimates of the British 1948 figures based principally on changes in output 1948–51. This seemed the best assumption to make, since in Canada changes in horse-power in use 1948–53 in the present group of industries were closely correlated with output, +0·88 compared with +0·81 with employment, +0·71 with electricity used and +0·89 with all fuels. The latter was not used as an indicator, since the British individual industry data showed fuel purchased in 1948, and fuel purchased and used in 1951, *Census of Production for 1951*, Summary Tables, Part 11, 1956, Tables 13, 14. It may be noted that it would have been desirable also to investigate horse-power hours worked per unit of output, since this would take account of differences in shift working between the two countries. Complete data were not available to do this.

poration in different-quality equipment. Since the per unit of output figures do not seem to explain the higher Canadian productivity, the fact that Canadian equipment was probably more up to date than the British is a possible explanation of the observed differences, a modern unit of horse-power being more effective, both in power transmission and in saving labour, than a unit installed some time ago. But it is difficult to say just how far this quality factor rather than any other is responsible.

The Combined Use of Factors

The probability of some substitution between labour and materials has been mentioned; between man-power and mechanised power it is clearly vital to productivity. Since one might expect to find that less labour is associated with more mechanisation, to observe the combined effect may be a useful addition to the analysis, as also may the combination of the three factors together.

A different method will have to be adopted from that used with labour and materials, since the indicator of mechanisation is not expressed in value terms, nor would it be easy to assess on what an appropriate value figure should be based.

A suitable method is to fit a functional relation to the basic data which contains a constant term indicating the degree to which the input–output structure of one country is removed from the other: this will be a measure of productivity as explained below. A logarithmic relation is convenient for this purpose, and its use may be demonstrated as follows. Suppose that for each industry the following particular relation holds:

$$x = (a)\ l^{\alpha} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where x is the quantity of output, and l the quantity of labour. (a) is therefore the parameter which relates the use of output with the use of labour, and α is the elasticity of output with respect to labour. (a) and α can be estimated by taking changes in one industry over a number of years or, showing something different, by combining the data for many industries at one point of time, as in this study. The ratio of Canadian output to the British in a particular group of industries will be $\frac{x_c}{x_b} = X$, and the labour ratio in these industries $\frac{l_c}{l_b} = L$. Thus a particular function relating the ratio of Canadian/British output with the ratio of labour for these industries would be:

$$\frac{x_c}{x_b} = \left(\frac{a_c}{a_b}\right)\ \left(\frac{l_c}{l_b}\right)^{\alpha} \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

or

$$X = pL^{\alpha} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

where p is the ratio of the two parameters connecting the use of output and labour. The assumption that the coefficient α is the same for this particular

group of industries in both countries is verified empirically below. Note that this ratio is of output/(labour) input, and that it differs slightly in concept from the reciprocal of the median of labour productivity as used in Table I.

It is straightforward now to combine labour with the degree of mechanisation H (as represented by horse-power):[1]

$$X = pL^{\alpha}H^{\beta} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (4)$$

and also the relative use of materials and fuel, M:

$$X = pL^{\alpha}H^{\beta}M^{\delta} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (5)$$

For present purposes, the important number is p, the ratio of parameters defining the relationship between output and the various inputs in the two countries, *i.e.*, a productivity ratio. Its magnitude will depend on the precise determinants included; if all forces affecting productivity could be incorporated on the right side of the equation (including some non-inputs such as restrictive practices), p would equal unity. If only some forces are included, *e.g.*, factors of production, then p shows the output/input ratio due to the factors not included. Thus it will be shown that as more inputs are included the p ratio falls.

Applying equation (3) to the data for the comparable industries only (with output based on the British price weight series),

$$p = 1{\cdot}92$$
$$\alpha = 1{\cdot}13$$

This showed that Canadian output per head was about 92% above the British,[2] which is perhaps rather higher than one would expect from Table I. But the result is due, in part, to the somewhat unsatisfactory determination of the regression as a result of the rather small number of values for the variates combined with some unevenness in their distribution.[3] These empirical results must therefore be regarded with some reserve.

[1] With H representing capital, (4) is the Cobb–Douglas production function. The convenience of using a logarithmic function of this type is clear: it gives a productivity ratio, elasticities of output, α and β are derived immediately and the constant-returns hypothesis can be tested. But one cannot be entirely satisfied about its validity, since the main justification for its use derives from empirical studies rather than theory. (C. W. Cobb and P. H. Douglas, "A Theory of Production," *American Economic Review*, Supplement, 1928, p. 139, and P. H. Douglas, *The Theory of Wages*, Chapter 5.) Moreover, precisely what these elasticities mean in practical economic terms, particularly for a heterogeneous factor such as capital (as used in the original formulation) or the degree of mechanisation (as used here) is not easy to say.

[2] The equation was fitted with the logarithms of the data $\log X = \log p + \alpha \log l$, the other equations being fitted in the same way. Here standard error of the coefficient $\alpha = \pm 0{\cdot}20$, $R^2 = 0{\cdot}9543$.

[3] In particular, the "petroleum" industry is of considerable importance in determining the coefficients because of its different size and labour ratios from other industries. If "gas" and "cattle, poultry feed" are included in the analysis (these were the only two rejected industries which were considered as possibly comparable, and their size and labour ratios differed from all other comparable industries), they may be considered as giving a strong guide to the slope of the regression line. Now $p = 1{\cdot}58$, $\alpha = 0{\cdot}97$ and R^2 is 0·8506. This suggests that the parameter p as calculated above is rather higher than it would have been if more industries could have been included.

By taking labour together with the relative degree of mechanisation (equation (4)), the combined productivity (output/input) index places Canada 55% above the British.[1]

$$\begin{aligned} p &= 1{\cdot}55 \\ \alpha &= 0{\cdot}73 \\ \beta &= 0{\cdot}31 \end{aligned}$$

If materials are added to the function, as in equation (5), with the same values for relative output, labour and horse-power, then the following results are obtained: [2]

$$\begin{aligned} p &= 1{\cdot}07 \\ \alpha &= 0{\cdot}15 \\ \beta &= 0{\cdot}15 \\ \delta &= 0{\cdot}67 \end{aligned}$$

By the inclusion of materials, therefore, the unaccounted part of the output/input ratio has dropped from 55% to only 7%. This 7% indicates the magnitude of the net resultant of factors not so far included, like the quality factor in horse-power, differences in the organisation, effort, shift working, etc., as well as the effect of errors of measurement. It must be repeated that, because of the small number of variates which could be included, and their uneven distribution, all these results should be regarded with caution, in particular the residual 7% derived from the three-factor regression, for the calculation of which the data were clearly inadequate; probably the main interest in this derivation of a combined index lies in the methodology.

[1] Standard errors, $\alpha = \pm 0{\cdot}20$, $\beta = \pm 0{\cdot}13$, $R^2 = 0{\cdot}9705$. In the original presentation of the function Professors Cobb and Douglas assumed constant returns to scale, such that $\alpha + \beta = 1$. No restraints were imposed here. The implication of $\beta = 0{\cdot}31$ is that a 10% increase in horse-power is associated with a 3·1% increase in output, keeping labour constant but permitting mobility elsewhere. The coefficient for α has changed from 1·13 to 0·73; the former was the elasticity assuming mobility in all factors, and the latter was the elasticity if the degree of mechanisation was held constant.

It may be noted that these coefficients for α and β are close to many of those obtained by Professor Douglas and others with H to represent capital and not mechanisation. P. H. Douglas, "Are There Laws of Production?" *American Economic Review*, 1948. Many results for α were between about 0·6 and 0·8 and for β between 0·2 and 0·4.

In order to verify the truth of the assumption that the coefficients α and β were identical in the two countries, values for p, α and β were also calculated for each country separately. The three magnitudes respectively for Britain were 327·0, 0·44, 0·13, and for Canada were 173·9, 0·45, 0·15. The coefficients were very close, and it will be seen that the Canadian parameter was 53% of the British, which checks closely with the answer obtained by computation from the ratios.

[2] Standard errors: $\alpha = \pm 0{\cdot}20$, $\beta = \pm 0{\cdot}12$, $\delta = \pm 0{\cdot}04$, $R^2 = 0{\cdot}9977$. Although the standard errors for α and β are high in relation to the coefficients, one would expect these coefficients to be different from those obtained with equation (4), which excluded materials. The reason, as before, is that now the degree of mechanisation *and* materials are assumed constant in the determination of the labour elasticity, and for the mechanisation elasticity both the quantity of labour *and* materials are held constant. It may be noted that in each answer the sum of the coefficients was close to unity, which suggests constant returns to scale.

Part II. Fundamental Causes of Differences in Productivity

One of the more interesting results in Part I was that Canadian labour productivity in selected industries was above the British in 1948, yet wages were so much higher that the average of Canadian unit labour costs was slightly higher also. Was this peculiar to 1948, or had productivity been different and labour costs similar for some time? And, following from this, what were the more fundamental reasons for the observed differences? A pointer was given when discussing real investment, but further analysis is required.

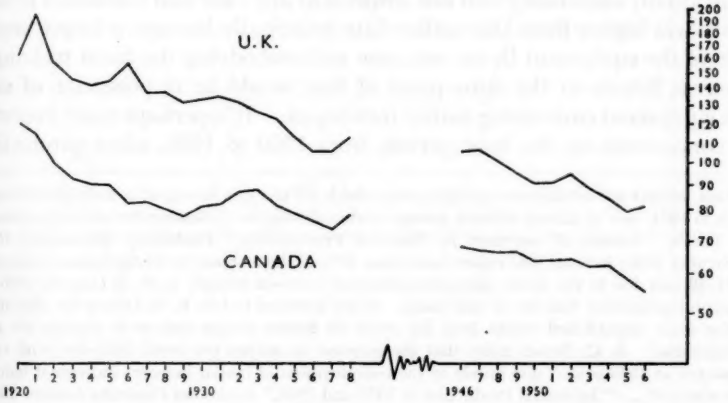
Labour Productivity and Costs before 1948

Graph 1 shows that United Kingdom labour productivity for all manufacturing industries [1] during the period 1920–56 had been rising rather

Graph I

Employment per Unit of Output in Manufacturing Industries

1948 U.K. = 100



faster than the Canadian (this is also shown in line 1 of Graph 2, which is the ratio of the two countries from Graph 1), although the United Kingdom rate of increase, when viewed from the technological standpoint,[2] was probably less fast than that indicated.

[1] The rather sweeping assumption was made that the average labour productivity ratio from the comparable industries held for all manufacturing industries in 1948.

[2] One can divide increases in labour productivity in a particular industry over time between two causes: first, increases within individual firms; and second, the transfer of labour from low to high productivity firms, which raises the average level of productivity without any one firm necessarily having altered its methods. For present purposes the former cause is of greater interest. It is not possible to assess the relative importance of the two causes for each industry separately in

Graph 2, line 2, shows the relative movements in unit labour (wage and salary) costs at a constant 1935–38 exchange rate, and line 3 shows the same as line 2 but at current exchange rates. It appears that the exchange rate brought unit labour costs remarkably close in the two counties during the inter-war period, but that since 1946 Canadian labour costs have risen to about double the British, due principally to devaluation. Clearly the differences in labour productivity (and the similarity in costs) began before 1920, but when?

From broad estimates [1] it appears that from the beginnings of widespread industrialisation in Canada, in the 1860's, up to about 1900 Canadian productivity growth rates were considerably higher than the British. Then for more than a decade, productivity failed to rise in either country, although hours of work fell in both, while from 1913 to 1920 the rate of increase was probably faster in Britain. Calculating back from 1920, one arrives at the conclusion that Canadian productivity was almost certainly higher than the British even in the 1860s.

It is impossible to elaborate on this further in a short space by comparing conditions in the two countries, which in any case have received attention individually elsewhere,[2] and one suspects in any case that Canadian productivity was higher from this earlier date principally because a larger proportion of the equipment in use was new and embodying the latest techniques, whereas Britain at the same point of time would be in possession of much old equipment embodying earlier techniques. It is perhaps more important to concentrate on the later period, from 1920 to 1938, when productivity

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Britain, neither are satisfactory statistics yet available for changes in output in individual industries back to 1924, but by taking industry groups crude calculations (following the method outlined by K. Borch, "Causes of Increases in National Productivity," *Productivity Measurement Review*, November 1956) indicate that rather more than 10% of the increase in British labour productivity 1924–48 was due to the better allocation of labour between groups, while in Canada 1926–48 a negligible proportion was due to this cause. (I am indebted to Mr. K. S. Lomax for allowing me to use some unpublished results from his study on British output indices in making the above calculations.) B. C. Brown notes that the increase in output per head 1935–48 (with output measured at 1935 prices) due purely to the redeployment of labour between individual industries was about 4%. "Industrial Production in 1935 and 1948," *London and Cambridge Economic Bulletin*, December 1954.

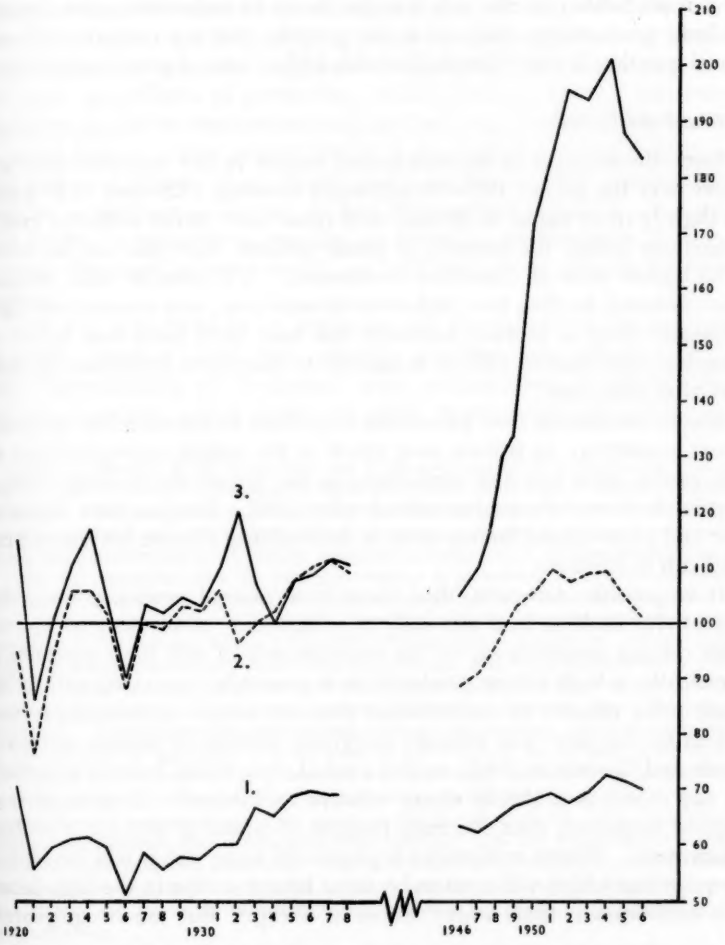
[1] O. J. Firestone in *Canada's Economic Development, 1867–1952* (shortly to be published: I am grateful to the author for allowing me to use results from the draft version given as a paper to the 1953 Conference of the International Association for Research in Income and Wealth) estimates that man-year labour productivity in manufacturing rose annually by 1·8% during 1870–1900, and that it remained practically stationary 1900–1920. For Britain D. J. Coppock, in "Climacteric of the 1890's: a Critical Note," *Manchester School*, January 1956, estimates that the average annual increase in industrial productivity (excluding building) was 0·5% during 1866/74–1900/7, and that from 1900/7 to 1908/13 it fell by about 0·1% per annum. Hours of work in Canada fell from 64·0 in 1870 to 56·7 in 1900; insufficient data are available for a man-hour comparison to be made with Britain (in 1906 hours of work in Britain were about 53·8). Rostas estimates that man-hour productivity rose by 27% 1907–24; *op. cit.*, p. 49.

[2] For Canada, see O. J. Firestone, *op. cit.*; also J. Viner, *Canada's Balance of International Indebtedness 1900–1931*. For Britain, see E. H. Phelps Brown and B. Weber, "Accumulation, Productivity and Distribution in the British Economy, 1870–1938," ECONOMIC JOURNAL, June 1953.

Graph II

Indices for Canada

U.K. = 100 *in each year*



Line 1. Relative employment per unit of output in manufacturing industry.
Line 2. Relative unit labour cost at constant 1935–38 Exchange Rate.
Line 3. As 2 at Current Exchange Rates.

rates of change may not have been widely different after allowing for a greater " transfer of labour " effect in Britain.

It has been shown that for the twelve years prior to 1938 Canadian real gross investment per employed head in manufacturing and distribution in 1938 was about double the British (per unit of output it was higher also), and it is probable that this was a major factor in maintaining the disparity in labour productivity observed in the graphs. But the crucial and fundamental question is why Canada had this higher rate of gross investment.

Investment and Growth

Since the changes in manufacturing output in the two countries were similar over the period 1920–38 (although between 1926 and 1938 growth was slightly more rapid in Britain, and there were rather different cyclical fluctuations within the period), it seems unlikely that this can be related to the higher rates of Canadian investment. It is possible that *anticipated* future demand, leading to a higher investment rate, was consistently higher in Canada than in Britain, although this may have been true before the Canadian depression of 1929, it is unlikely to have been significant for many years after that date.

Special conditions may have been important in determining investment in both countries; in Britain over much of the period unemployment was high, profits were low and confidence in the future was lacking, while in Canada there was the major setback after 1929. But just how important these and other special factors were in determining relative investment rates is difficult to estimate.

It is possible, however, that there is a general tendency for a high productivity itself to lead not only to a high rate of investment but also, under certain assumptions, to the maintenance of this high productivity. Empirically, a high labour productivity is generally associated with a high labour price relative to commodities (relative wages approximately equal the relative average (and possibly marginal) product of labour, as between Britain and Canada in 1948), so that capital equipment, being a commodity like any other, is probably cheap relative to labour.[1] If demand is not expected to change, then the main purpose of capital investment is probably replacement. Where equipment is physically worn out it will be replaced by equipment which will tend to be more labour saving in the high-labour-price environment than where labour is cheap.[2] But much equipment is

[1] Although the ratio may well be different from the consumer-goods/labour-price ratio because of differential rates of productivity growth in a previous period, the existence of such a difference is irrelevant here, the important assumption is that the producer-goods/labour-price ratio between the two situations should not equal unity.

[2] In certain cases the length of life for which British equipment is designed appears to be longer than in the United States, so that replacement of this equipment with that more technically advanced will be more rapid in the United States; in so far as Canada uses American equipment or has adopted American habits the same will apply there.

replaced through obsolescence, of which an important determinant is whether or not the *additional earnings* achieved from the new equipment will be high.[1] Now where labour is or may become expensive relative to equipment, then the additional earnings from replacement with more modern *labour-saving* plant will be greater than where labour is cheap. And where labour is or may become cheap relative to equipment, there will be a tendency either not to replace or to install more *capital-saving* plant than where labour is expensive. Thus, *ceteris paribus*, even though the range of technical possibilities of production is the same in the two environments, replacement due to obsolescence will be more rapid, and the equipment will be more labour saving where labour is dear relative to equipment. This will lead to a higher labour productivity, and to a lower commodity price relative to the price of labour; and so the process is repeated. But whether this results in converging, parallel or diverging productivity growth lines between the same industry in the two environments is difficult to determine *a priori*.[2]

For this hypothesis to be important for the present study, it would be necessary to show that the earnings criterion was effective and that other determinants of investment were unimportant relatively between the two countries, which could not easily be demonstrated even if it were

[1] See, for example, P. W. S. Andrews and E. Brunner, *Capital Development in Steel* (1951), pp. 263, 356; also R. Eisner, *Determinants of Capital Expenditures* (University of Illinois, 1956), pp. 31, 47, 65, etc., which suggests that in many cases the earnings (or savings) criteria were important. In most small firms such calculations will not be made, so that the hypothesis is weakened, even though entrepreneurs may sense that the additional earnings due to replacement might be great.

[2] On the assumption that the earnings criterion is paramount in determining machinery investment, then in one country the productivity response can be defined in terms of the product of two elasticities: that between machinery investment with respect to the anticipated additional earnings and that between labour productivity and machinery investment. If this multiple is unity, then a specific labour/equipment price ratio will lead to an identical productivity difference; and if that marginal change in productivity itself leads to an equal marginal change in the labour/equipment price ratio in the machinery industry, then the productivity rate of increase will be maintained. The ratio of additional earnings between two countries, due to the introduction of an identical piece of equipment with the same capital costs, will be the same as the ratio of the labour/equipment price ratio. In practice, it is probable that the elasticity of productivity with respect to machinery investment will fall as productivity reaches the higher levels.

One sees that management may be equally skilled in two countries, yet because of different economic environments their actions may differ, although each acts as any skilled entrepreneur would think best in his own conditions. How far a difference in attitude towards the installation of equipment between Britain and North America has been conditioned by the different economic environments, and how far it has been due to the stock of the people, their philosophy, climate, etc., is unknown.

The most obvious implication for policy from this hypothesis is that productivity in the machinery-making industry should be encouraged to increase as rapidly as possible, so that equipment will become cheap relative to labour and its use encouraged.

See also Mrs. J. Robinson, *op. cit.*, Chapter 10. I am indebted to Dr. Salter for pointing out to me the possible significance of obsolescence in this connection. It may be noted that this general hypothesis is in broad agreement with the suggestion by Professor Melman that the dynamic factor in productivity adjustment is the relative cost of labour to machinery ("Dynamic Factors in Industrial Productivity").

true. What one can say is that the price of labour relative to the price of equipment was rather greater in Canada than in Britain during much of the inter-war period,[1] so that there may have been a rather greater incentive in Canada to invest in equipment.

Conclusions

From the statistical data which have already been summarised, it appeared that in those industries examined labour productivity was rather higher in Canada than in Britain in 1948. Whatever may have been the average difference if all manufacturing industries could have been included on the same basis, approximately the same difference had existed at least since 1920; assuming that the average of industries in this study was representative of all industries, it is probable that from the time when industrialisation in Canada became widespread her labour productivity was higher than in Britain. Labour costs per unit of output were remarkably close between the two countries in the inter-war period, but they diverged sharply after the Second World War, owing principally to the devaluation of 1949.

Although it was not possible in this study to discover precisely how the Canadians achieved this higher level of labour productivity in 1948, it was felt to be related in part to the type of fuel used (their greater use of oil and electricity), but more particularly to the greater modernity of Canadian equipment. It was possible to approach measurement of the latter for only a limited period between the wars, and then only for a group of industries much wider than those in this study; nevertheless, this period was clearly relevant to the position in 1948. Real gross investment in machinery and equipment in " manufacturing and distribution " aggregated over more than a decade and related to employment in 1938 was about twice as high in Canada as in Britain; related to output it was also clearly higher. Special circumstances which may have accounted for this were present in both countries, but it was suggested that, as a general principle, a high productivity may lead, through a high labour/equipment price ratio, to the installation of equipment which is more labour saving, and to the more rapid replacement of equipment through obsolescence than where labour is cheap relative to equipment, and that this in turn leads to higher productivity in the country where labour is expensive.

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[1] If equipment prices were about level in 1948, as already suggested, then the labour/equipment price ratio was about 69% higher in Canada in 1948, in 1937 about 45% and in 1926 about 51%.

Appendix A

Sources and Methods

Gross Output

Using 1948 Census of Production data, the aim was to measure the quantity of goods produced for sale outside each defined industry, *i.e.*, sales of principal and other products, excluding items classified to other trades, adjusted for stock changes. This was calculated from quantity and value data at constant British and Canadian prices as already described. The "ring fence" method was followed (D. Paige and S. Adler *op. cit.*), sales between firms within the same industry were excluded (*e.g.*, sales of pig iron to steel furnaces). This involved some estimation due to lack of detail, particularly about "other products," although for Britain Board of Trade estimates were used wherever possible ("gross output free of duplication," Table 6 of the *Census of Production for 1951*, Summary Tables, Part II, 1956); in Canada both output and materials and fuel used were given in great detail in almost every industry examined, so that fair estimates could be made.

In every case a part of the value of production (on the average 14% in Britain and 12% in Canada) remained not identified ("all other products"), or not paired (by-products produced in one industry but not in the other), or not quantified. Occasionally it was possible to find a relative price for the latter two groups from other sources. In general, to value the "non-matching" part at the other country's prices it was assumed that the average price ratio for the paired products would apply also to the non-matching products—the "price assumption"—since all derived from the same industry.

This procedure gave two answers for relative output in each industry, one using British and one using Canadian prices. In most comparable industries the difference was small, but in rubber and tobacco it was significant. Where one series only was required, rather than taking the geometric mean, that reckoned to contain the least error was used. In all except two industries, iron foundries and cotton textiles, where the two figures for output were close anyway, it was found that that part of output value to which the "price assumption" was applied was greater in Britain than in Canada; in other words, the non-matching part was rather greater in Britain. Thus at British prices one is making an assumption, based on British data, about the (relatively small) non-matching part in Canada, and at Canadian prices one is making an assumption based on Canadian data about the (rather larger) non-matching part in Britain; assumptions made from one country's data about the other may therefore be reduced—and errors reduced—by using British rather than Canadian prices.[1]

Net Output

Although gross measurements were preferred to the net, as explained, net indices using the Geary formula were also calculated. In all of the comparable industries the net and gross indices were very close, except for petroleum and coke ovens. Here the value of materials and fuel was over 90% of the value of gross output, hence small errors in either gross output or materials and fuel would be greatly exaggerated in the net measurement; the discrepancies probably stemmed from this.

[1] I am indebted to Miss D. Paige for pointing this out to me.

Materials Used

Like gross output, materials were calculated as materials used in current production purchased from outside the defined industry. The non-matching part of the total value (average 22% in both countries) was converted to the other country's prices at the current exchange rate and not at the average price of the paired commodities, since the materials were purchased from many diverse sources between which the international price ratios would best be represented by the average for all commodities as shown by the current exchange rate.

Fuel Used

The Canadian fuel and power Census in 1948 (and 1953) gave full details. The difficulty in the British Census about stock changes has been mentioned. The negligible uncovered part of the value of fuel used was converted to the other country's prices at the current exchange rate. Conversion rates into British Thermal Units were taken from H. M. Spiers, *Technical Data on Fuel.*

Employment

Males and females were classed separately, numbers being reckoned as the wage and salary bill at constant prices. The male–female earnings ratio was obtained from the British *Ministry of Labour Gazette* and the Canadian *General Review of Manufacturing Industries* and applied to the operative and administrative wage bills to obtain the total male and female earnings in the four categories.

In Canada no numbers were ascertained on Census forms for " retail and wholesale operations (including travelling salesmen)," while in Britain these employees were included whether or not the sales office was at the same address as the manufacturing plant, but any selling organisation for which separate accounts were kept was excluded. It is probable, therefore, that some sales staff were included in the British Census which were excluded from the Canadian, but the numbers involved are likely to be relatively small.

Transport employees were excluded from the British figures for comparability with the Canadian.

Canadian Census returns issued no specific instructions about the inclusion of canteen workers; in Britain they have been excluded from the comparison.

Working proprietors were included. In Canadian data their earnings were reckoned as " withdrawals during the year for normal living expenses of self and family . . . excluding withdrawals for payment of income tax." In the British Census their earnings were omitted, but here they were assumed to be the same as the average of the administrative group, with whom they were included.

Payment in kind was included in the Canadian figures, but excluded from the British.

Prices

Price ratios resulted directly from the comparisons. In Britain Census average values for individual commodities sold were based on the " amount charged to customers, whether on an ex-works of delivered basis," [1] transport payments made by them to other firms for transport outwards were shown in total separately. In Canada Census forms specified " selling value at factory."

Similarly, the British value of materials and fuel included " transport charges to the works, other than transport carried out by the establishments' own staff." [1]

[1] *Final Report on the Census of Production for 1948,* Introductory notes, pp. I–VIII.

Canadian data were consistent in including freight (" laid-down value at the factory ").

Small Firms were excluded in Britain but included in Canada.

Calculation of Relative Real Gross Investment in Plant and Machinery

In Canada the figures for gross investment were from *Private and Public Investment 1926–1951.* They included new investment, with repair and maintenance shown separately, in machinery and equipment (" installed cost of machinery, motors, etc., and the delivered cost of office furniture and fixtures, motor vehicles and other transportation equipment," including small items of current expenditure such as small tools and office equipment, p. 213) in Manufacturing (Table 69), Trade (Table 67), Commercial Services (Table 69), Construction (Table 23) and Mining (Table 22). These were converted to pounds both at the current exchange rate and at an estimated commodity exchange rate, as described above, and inflated to 1948 prices using the series for current and constant-price dollars in machinery and equipment in Table 13. (The inadequacies of this inflation method are recognised.) Employment figures were from the D.B.S. series for manufacturing, trade, services, construction and mining given in the *Statistical Review*, 1955 Supplement, and in the 1955 *Canada Year Book*, p. 1336, etc.

For the United Kingdom, P. Redfern, Table 9, was used; plant and machinery, including vehicles, for manufacturing and distribution at constant 1948 prices (distribution included " Mining and quarrying other than coal, building and contracting, road goods transport, broadcasting and distribution and other service industries," p. 178). Employment was from A. Chapman, *Wages and Salaries in the United Kingdom 1920–38*, Tables 1, 40, 41.

To calculate aggregate real investment 1926–38 per head in 1938 was straightforward. Average annual real gross investment per head in Canada was calculated for each of six groups within manufacturing (animal and vegetable products, textiles and clothing, wood and paper, iron and non-ferrous metals, chemicals and non-metalliferous products, and miscellaneous) and for wholesale and retail trade, commercial services, construction and mining. These were then averaged using first the Canadian average employment figures 1926–38 for the respective groups as weights, and then the corresponding United Kingdom figures 1924–38, the latter being that which gives the closest comparison.

(*Note:* in the Canadian " Public and Private Investment," Table 39 (Miscellaneous Industries), an allowance was included for " capital items charged to operating expenses in all manufacturing industries." An estimated amount was distributed *pro rata* between the other five manufacturing groups.)

Mr. Redfern's figures excluded repair and maintenance, and, for comparability, they were excluded also in Canada. It is possible that major repair works might be included in " new investment " in one country and in " repairs and maintenance " in another, but it is difficult to assess the relative prevalence of this.

A. Aggregate Real Investment in Machinery and Equipment 1926–38 (Excluding Repair and Maintenance) per Head in 1938

	United Kingdom.	Canada.	
		(*a*)	(*b*)
Aggregate, £million (1948)	2,808	752	701
Aggregate per head in 1938, £ (1948) . .	216·1	491·4	458·6
	(100	227	212)

B. Average Annual Real Investment per Head in Machinery and Equipment (Excluding Repair and Maintenance)

	United Kingdom, 1924–38	Canada, 1926–38.
		(*a*)
Average annual employment, '000	11,370	1,369
Average annual gross investment, £million (1948) .	211·2	57·8
Ditto per employee:		
(*a*) at Canadian weights, £(1948) . . .	—	42·2
(*b*) at British weights, £(1948) . . .	18·6	36·8
(18·6 : 42·2 = 100 : 227)	(100	198)

(*a*) Canadian dollar converted to pounds sterling at current exchange rates.
(*b*) Ditto at estimated overall commodity exchange rates.

Calculation of Indices for Graphs 1 and 2

In Britain the output series for manufacturing industries was from *Industrial Statistics 1900–1955* (O.E.E.C., 1955). This index (with 1938 as 100) appeared to be based on 1935 prices (between 1938 and 1948 it corresponds almost exactly with B. C. Brown's estimates at 1935 prices in " Industrial Production in 1935 and 1948," *London and Cambridge Economic Bulletin*, December 1954). Employment and average annual earnings were from A. L. Chapman, *Wages and Salaries in the United Kingdom, 1920–38*, and for post-war years from the *Monthly Digest of Statistics* and the Blue Books on *National Income and Expenditure*.

In Canada the output series was from the same O.E.E.C. publication, and the employment and earnings series were from *Canada Year Books*, the revised figures given in the 1939 *Yearbook* and after.

It may be noted that the output series in both countries was based on pre-war price weights. If this had been based on post-war weights British output between 1935 and 1948 would have appeared to rise rather less fast (31% compared with 41% according to B. C. Brown's estimates), which would have given a lower rate of productivity increase between those dates. In Canada to have revalued the output index at 1947 weights instead of the 1935–39 weights actually used would have made little difference (the increase in production between the two dates was 107·7% at the pre-war weights and 102·8% at the post-war weights. " Revised Index of Industrial Production 1935–1951," *Dominion Bureau of Statistics Reference Paper, No. 34*, p. 17).

APPENDIX B

Basic data for those industries which form the subject of this study are given below.

	Value of output.				Value of materials and fuel.				Total wages and salaries.				Horse-power in use.	
	$\Sigma Q_B P_B$	$\Sigma Q_e P_e$	$\Sigma Q_B P_e$	$\Sigma Q_B P_B$	$\Sigma Q'_B P_B'$	$\Sigma Q'_e P_e'$	$\Sigma Q'_B P_B'$	$\Sigma Q'_e P'_B$	$\Sigma Q''_B P''_B$	$\Sigma Q''_e P''_e$	$\Sigma Q''_B P_e''$	$\Sigma Q''_e P_B''$	Q_B'''	Q_e'''
	£'000	$'000	$'000	£'000	£'000	$'000	$'000	£'000	£'000	$'000	$'000	£'000	'000	'000
Petroleum refining	43,500	370,970	148,484	100,690	36,001	326,210	128,896	91,597	2,944	21,524	20,238	3,140	35,000	89,179
Cotton spinning and weaving	262,541	185,764	865,333	55,022	146,737	102,016	446,297	33,275	61,903	47,609	435,313	6,946	870,592	113,344
Biscuits	36,788	51,409	154,856	12,213	24,019	26,525	79,515	8,619	7,494	8,942	47,309	1,388	26,660	8,103
Cement (not quarries)	27,628	30,562	108,725	7,766	—	—	—	—	3,552	3,825	22,888	572	—	—
Confectionery	85,262	99,686	323,813	25,422	55,225	54,331	194,818	15,445	14,136	15,227	85,188	2,537	66,000	21,945
Blast furnaces, iron and steel	312,130	290,566	1,332,039	68,561	174,375	130,200	748,153	32,614	85,288	77,358	589,903	11,288	2,085,045	361,410
Tobacco	98,335	107,077	416,487	28,454	52,464	53,262	192,112	14,654	13,071	17,127	89,113	2,436	29,262	5,833
Clothing	269,992	457,703	1,330,450	98,628	144,086	225,000	639,007	55,188	79,969	123,312	525,924	18,884	60,000	12,935
Soap, glycerine, candles	53,685	66,687	258,108	14,672	39,040	38,298	146,867	10,011	6,054	8,125	45,667	1,174	42,764	12,263
Rubber	123,773	194,112	618,259	47,008	70,526	87,113	230,969	26,974	27,815	48,273	189,994	7,101	310,360	109,549
Iron foundries, tubes	161,468	123,597	666,372	29,842	72,347	52,324	321,803	11,776	54,042	46,388	368,960	6,869	374,159	66,251
Sugar refining	127,595	113,510	430,446	33,500	81,054	90,785	363,964	19,419	6,447	7,662	41,214	1,199	109,366	31,946
Coke ovens	75,480	73,855	323,641	17,173	60,127	48,551	262,197	11,114	6,689	8,414	47,811	1,176	131,661	27,919
Footwear	123,446	105,340	440,653	29,751	68,824	56,608	278,384	13,965	29,527	32,513	164,236	5,820	75,098	12,008

Note: The Qs represent quantities, and the Ps prices: suffixes denote Britain or Canada.

CLIVE BELL ON KEYNES

THE volume of personal recollections before us [1] contains an article about our former editor, J. M. Keynes, and a notice in these pages, therefore, seems appropriate. Mr. Clive Bell was an intimate friend of Keynes over a great many years, and future historians will accordingly, whether professional economists like it or not, assign high authority to his testimony.

His book makes agreeable and entertaining reading. It is written in a pleasant, easy and natural style. It is light, but there are many subtle touches and vivid pieces of portraiture. It provides a close-up and intimate view of a number of famous English people, most of whom constituted what used to be known as "Bloomsbury," and also fascinating sketches of life in Paris, and of various artists who were living there, both before and after the First World War. It reveals much which cannot fail to be of interest in relation to the culture of the early twentieth century.

I will first quote two passages in which Mr. Clive Bell pays his tribute to our great economist:

> "Maynard was the cleverest man I ever met: also his cleverness was of a kind, gay and whimsical and civilized, which made his conversation a joy to every intelligent person who knew him. In addition he had been blest with a deeply affectionate nature. I once heard him say, humorously, but I believe truly, at dinner, before a meeting of the memoir club, 'If everyone at this table, except myself, were to die tonight, I do not think I should care to go on living.' He loved and he was beloved. He did not love, though he may have rather liked, me; and I did not love him. That should be borne in mind by anyone who does this sketch the honour of a reading.
>
> "In great things he was magnificently generous; generous to his country, generous to his college, generous to servants and dependents, particularly generous to his less fortunate friends (I know two charming young men who may or may not know that they were educated—and highly educated—partly at his expense). In small things, however, like many who have enjoyed the advantages and disadvantages of a serious, non-conformist upbringing, he was careful" (p. 52).

and again:

> "In spite of all the little annoying things that have stuck in my memory, my recollection of Maynard, vivid and persistent, is that of a delightful companion. I miss him; and I understand the feelings of those who more than miss, of those for whom the wound caused by his death never quite heals and may at any moment become painful. What I miss is his conversation. It was brilliant: that is an obvious thing to say but it is the right thing. In the highest degree he possessed

[1] *Old Friends*. By Clive Bell. (London: Chatto & Windus, 1956. Pp. 200. 21*s*.)

that ingenuity which turns commonplaces into paradoxes and paradoxes into truisms, which discovers—or invents—similarities and differences, and associates disparate ideas—that gift of amusing and surprising with which very clever people, and only very clever, can by conversation give a peculiar relish to life. He had a witty intellect and a verbal knack. In argument he was bewilderingly quick, and unconventional. His comment on any subject under discussion, even on a subject about which he knew very little, was apt to be so lively and original that one hardly stopped to enquire whether it was just. But in graver mood, if asked to explain some technical business, which to the amateur seemed incomprehensible almost, he would with good-humoured ease make the matter appear so simple that one knew not whether to be more amazed at his intelligence or one's own stupidity. In moments such as these I felt sure that Maynard was the cleverest man I have ever met; also, at such moments, I sometimes felt, unreasonably no doubt, that he was an artist.

"That Maynard Keynes was a great man is generally admitted; but in private life no one could have been less 'great-manish.' He was never pompous. His greatness no doubt revealed itself most impressively in economics—the work of his life—in organisation and negotiation; but of greatness in such matters I am not competent to speak. Nor yet, alas! am I entitled to speak of what to some was his most memorable quality: for me his cleverness was what counted most, but to a few privileged men and women who knew him through and through his supreme virtue was his deeply affectionate nature. He liked a great many people of all sorts and to them he gave pleasure, excitement and good counsel; but his dearest friends he loved passionately and faithfully and, odd as it may sound, with a touch of humility" (pp. 60–1).

These passages serve to indicate not only that there was a long friendship, but also that there was some slight element of lack of sympathy, between the two men.

Immediately on the publication of this volume I became aware of a rather strong vein of protest on the side of professional economists. Knowing, as they do, so much of the true greatness of Keynes, they were incensed that Mr. Bell should have written in terms that, despite the passages quoted above, are on the whole derogatory, and even slightly mocking. For their assuagement, and, more important, for the information of those future historians who will undoubtedly look to Mr. Bell for insight and knowledge about the character of the great economist, I would quote words from my *Life of Keynes*, which were written some time ago:

"It has been erroneously held that Bloomsbury was in the nature of a mutual admiration society. This is very far from the truth. No doubt as friends they would give each other a helping hand towards material advancement. But within the circle they were keenly critical of one another. There was no question of molly-coddling. A sharp, biting wind of criticism blew through all the recesses of their habitations.

> They did not give mercy nor expect it. Indeed, if you chanced to hear one member of Bloomsbury pull another to pieces, not leaving a shred, destroying him utterly, you might wonder what form their criticism would take when directed against an outsider " (p. 187).

Mr. Bell was a member of Bloomsbury, and it is important that the future historians aforementioned should, on reading his judgment of Keynes as a man, have in mind the settled and ineradicable habits of mutual criticism in Bloomsbury. The meaning of words of praise or blame depends on where one pitches one's standard; is one writing in terms of qualifications for a Professorship or for a Pass Degree? For instance, Mr. Bell describes Keynes as " provincial " and gives certain reasons which make the charge plausible. But then have not almost all the greatest Englishmen been provincial in the sense described? How many distinguished living Englishmen would be exempt from the charge of provincialism? We are not concerned here with cosmopolitan gad-abouts or mere social lights. Would the number be about half a dozen? I should find it difficult to name so many. To one habituated to the Bloomsbury style these strictures do not give offence. But to a wider audience they may be quite misleading.

The two main criticisms which occupy most of Mr. Bell's pages are: (1) that Keynes had a most irritating habit of cock sureness about matters on which he was not well informed, and (2) that he lacked æsthetic discrimination. Both these matters are dealt with in my *Life of Keynes*, where, I would suggest, they occupy the amount of space which is appropriate to their importance in their relation to the whole man.

The former point is dealt with as follows:

> " Another failing may be mentioned in this connexion. He cultivated the appearance of omniscience. He held forth on a great range of topics, on some of which he was thoroughly expert, but on others of which he may have derived his views from the few pages of a book at which he had happened to glance. The air of authority was the same in both cases " (p. 468).

There is no doubt that this characteristic was irritating and set some people against him.

The other point I have also mentioned, even quoting Strachey's derogatory remark cited by Bell:

> " Some hold, perhaps correctly, that his success in this field [picture collecting] was due to some uncanny extension of his intellectual power into the world of æsthetics, and that he was never deeply moved by visual, as he undoubtedly was by literary, beauty. Strachey indeed, is said to have remarked when in a peevish mood, ' What irritates me so about Pozzo [1] is that he has no æsthetic sense,' " (p. 120).

[1] I.e., Keynes.

Mr. Bell would amend this appraisal by deleting the third word—" perhaps." He also questions—wrongly I believe—his literary appreciation. I debated with myself for a long time whether I should write in this passage " probably " instead of " perhaps." Mr. Bell would claim certainty, but there, with due deference to his high artistic authority, I believe that he is wrong. People with great æsthetic sensibility are sometimes capable of howlers, such as those he cites in Keynes' case. But it strikes me that Bell is lacking in judgment in believing that one can be certain about the sensibilities of a man with so many facets as Keynes had, so many tentacles, such intelligence, such perceptivity about people, such depth, such intuition about unexpected matters, which often took one by surprise. On this point we, and future historians, should preserve some degree of agnosticism.

My main purpose, however, in writing this review is to set upon record for the benefit of future research workers that in my own judgment Mr. Bell is wrong on two points of substance:

1. The first point may merely be one of verbal interpretation; but none the less it is important. Mr. Bell writes: " I fancy it was about this time or a little earlier that he took to speculating." This was in the summer of 1914. It ante-dates his speculation by more than five years. He took to speculation in September 1919. This is not to say that he may not have had an occasional flutter, like anyone else, or perhaps a good many more than most people. He loved any opportunity to have a gamble. He was drawn to the gaming tables. But in relation to Keynes the words " took to speculation " have a more definite significance. His speculation was a very important ingredient in his life considered as a whole; through speculation he made himself a rich man, and this fact affected many other things. It was this important speculation, this systematic speculation, that started in the autumn of 1919.

My evidence is as follows. Keynes was a great hoarder of materials, and he kept massive files relating to all his speculations, which began at the date named. At that time also he wrote to his mother, telling her that he had begun to speculate, and wondering how his father would view the matter. It was his habit to confide all his private affairs, within reason, to his parents. There is no reference to speculation before this either in his letters to them or in other letters. When he began he was quite open to them about it. When writing his life, I went in some detail into his financial affairs. In 1919 he still had no capital, save for a few pounds in the bank. He borrowed small sums from members of his family, in order to give himself the where-with-all for his speculation. From that time forward he was a capitalist on his own account. If he had had some flutters at an earlier date, they could only have been occasional, and they led to nothing.

It is important that this should be clearly understood, since there were many ill wishers in his middle period who asserted that he took advantage

of inside information when in the Treasury (1915–June 1919) in order to carry out successful speculations. This allegation is entirely without foundation, and it is accordingly desirable that Mr. Bell's wrong dating should be corrected.

2. There is a second point on which I wish to challenge Mr. Clive Bell, for the sake of the "record." "It seems not generally to be known—though Mr. Roy Harrod has not attempted to conceal the fact—that Lord Keynes was a conscientious objector." It is true that Mr. Bell immediately adds:

> "To be sure he was an objector of a peculiar and, as I think, most reasonable kind. He was not a pacifist, he did not object to fighting in any circumstances: he objected to being made to fight. Good liberal that he was, he objected to conscription. He would not fight because Lloyd George, Horatio Bottomly and Lord Northcliffe told him to. . . . As for his conscientious objection, he was duly summoned to a tribunal and sent word that he was much too busy to attend."

Readers of my *Life of Keynes*, where I have treated the subject of Conscientious Objection at some length (pp. 213–16), know that this was not the end of the story. Incidently it was not when summoned to a "tribunal" that he pleaded that he was too busy, but when he received his ordinary calling-up notice. My *Life* proceeds:

> "He did not carry this policy through to its final conclusion, for a year or two later the Treasury discovered a gap in its records. In the file there was no record of exemption against his name. And so to placate the Treasury Establishment Officer, he walked quietly round and went through the formalities of obtaining exemption" (p. 215).

I submit that there was not any sense, peculiar or other, in which Keynes was a Conscientious Objector in the First World War. In this respect I would place him with Lowes Dickinson, than whom there was no more passionate peace-lover. He held that it was the duty of Britain to intervene in 1914; that granted, there was nothing more to be said about "objection." I submit that, had Keynes not been doing work of supreme national importance and had he been physically capable of being an efficient soldier, he would have answered the call when it came to him. He was far too honourable a man to have reported for duty, as in fact he eventually did, had he really been a conscientious objector to it. I protest in particular against the reference in this context to Lloyd George, Horatio Bottomly and the like—as though it could have made the slightest difference to Keynes' notion of his duty what certain vulgarians and superficial persons advocated or ordered. His integrity, his independence of mind, his sense of history, his fine judgment, raised him on to an altogether different plane.

To suppose that Keynes was an Objector in any sense is to render his

attitude at the Paris Peace Conference unintelligible. The essence of that attitude was that he felt passionately to the core of his being about our duties at the peace-making. There were detractors at the time who held that he made such a fuss only to score some easy publicity. Such a view is made untenable by the letters that he wrote from Paris, and by the temper of the book itself, compared with all his other writing. His exasperation and bitterness at Paris are to be explained only by his having previously committed himself at heart to the policy of war—no doubt reluctantly and with misgivings. It was the duty of the nation, with which he had identified himself, to expiate the guilt of war by a just peace. A man who had been sceptical throughout and had not entered heart and soul into the conflict would have been much more blithe at Paris when things went in the bad old way. All this I have endeavoured to explain in my book.

How, then, do we account for the incident referred to by Mr. Clive Bell? The explanation is really quite simple. When he received the tiresome calling-up paper he was doubtless irritated and answered as Mr. Bell described. And then having done that, he made the most of it with his Bloomsbury friends. Surely a harmless ruse! They had pressed him hard in argument, and he on his side had respect for their views. He told them how he had scorned the calling-up notice. This was just a little gesture of appeasement to his Bloomsbury friends, which did no one any harm. But when pressed by the Establishment Officer, he submitted himself to the authorities in the ordinary way.

I should like to take this opportunity of making a gentle *riposte*. For when my *Life of Keynes* appeared, one member of Bloomsbury, *not* Mr. Clive Bell, (and one other Bloomsbury-briefed reviewer), wrote in terms that implied that he, unlike the biographer, had greater knowledge of the "real" Keynes. Of course to know a man when he is young is to know certain deep and important things which later become overlaid. But after reading the voluminous letters Keynes wrote to his father and mother I probably know things about the character of even the young Keynes which his Bloomsbury friends never appreciated.

In the 'twenties I had the honour of being elected to the Cranium Club, of which almost all the leading persons who composed the Bloomsbury group, together with certain less intimate friends, were members. Some hold that the heyday of Bloomsbury was before 1914. It had, however, a sort of second heyday in the 'twenties. After the death of Lytton Strachey in 1930, disintegration set in. Strachey was indeed the creator and essence of Bloomsbury, a rare and exquisite being, beyond description. And it was thus that Keynes rated him. There at the meetings of the Cranium Club in a Soho restaurant, once a month, I heard these men talking at their ease, in their familiar style, as friend to friend, of gossip or serious subjects, as they sat after dinner sipping their brandy. Later we often adjourned to some house of a member in the neighbourhood—in fact in

Bloomsbury!—to carry on the conversation. There I endeavoured, with such faculties as I had, to imbibe the essence of their point of view.

It so happened that during the first few years of my membership, Keynes had not been elected, perhaps because his marriage gave displeasure in that period. Then the time came when he was elected. I remember vividly the excitement of wondering how Keynes, who by that time had been my friend for a number of years—but I had seen him mainly in academic circles—would mix with these people, his own great friends, whose ways I had got to know through many evenings. I could not help feeling a slight premonitory sense of incongruity, and, when he came, surely enough I did perceive a certain sea-change in him. Oh, it was the subtlest thing in the world, nothing crude or unworthy, but yet distinctly discernible. And if I have to find a term for the difference, I would name a quality which I never later saw him display at meetings of Ministers and other bigwigs—I would say that he showed a certain deference. It was perfectly natural: these were people from whom he had learnt so much, who represented for him what is finest in the human kind, who were indeed his friends, but something more. Thus I endorse Mr. Clive Bell, when he writes "a touch of humility." That being so, how natural, too, it would be for him to tell these friends, sincere Conscientous Objectors most of them, that he had received the calling-up papers from those devils and had merely written to say he was too busy. After all, it was rather funny; it was just a bit of nonsense; anyhow forgivable. It is given quite a wrong dress when it is solemnly stated—with my authority into the bargain!—that "it seems not generally to be known that Lord Keynes was a conscientious objector."

When I came to write the *Life* I had many lengthy talks with various Bloomsbury figures. While they were all as kind as could be, I had the sense they were asking themselves the question how on earth an outside person could ever manage to write the life of their Maynard. But there was simultaneously borne in upon me a stronger, and more surprising, feeling, namely, that my interlocutors did not know what the "real" Keynes was like. With Mr. Clive Bell, "I understand the feelings of those old and intimate friends who say (of my book)—'Maynard was not really like that, he was not like that at all'." But I doubt if *they* will understand *my* feelings. There were many aspects that they did not see, which we of the younger generation could see. I suppose they thought that when Keynes talked to his younger academic friends he spoke only of economics or of college shop. They did not suppose that he could possibly unburden himself or bare himself to us. But the years passed by, and Keynes' character evolved. And the type of mind that could best appreciate that character changed too.

There are various aspects of life, and character develops in relation to them. In the quest for scientific truth—and in this connection economics must be regarded as a science—certain rare and distinctive faculties are

needed. And in public affairs certain other faculties, different and not less important. And when I think of both these sets of faculties in relation to the outlook of Bloomsbury I cannot help uttering, " There is more in heaven and earth, Horatio." Courage and integrity in the furnace of practical events—which are somewhat different from courage and integrity in thought and feeling—the power of compromise, unflagging resilience, judgment about the practicable, about men's motives in action, fairness in thought to the views of one's adversaries, these are some of the high qualities of statesmanship. Bloomsbury thought of politicians as a set of rapscalians, and no doubt in one sense they often are. But they have their virtues too, and on the continuing presence of those virtues the fate of men depends. I felt that these friends did not really understand how remarkable, how really great, were the qualities that Keynes evinced in relation to such matters. Mr. Clive Bell modestly writes in reference to " economics, organisation and negotiation," that " of greatness in such matters I am not competent to speak." Incidentally, the words " organisation and negotiation " are rather too weak and pedestrian in relation to the range of higher qualities that I have in mind.

In one way I was consoled by my Bloomsbury conversations. It became plain to me that no surviving figure of that circle, Lytton Strachey being dead, would be able to write an adequate tribute to Keynes—not because of his economics, for a ghost could be found to supply that part—but because they did not understand many of the real elements of greatness in their friend. I at least knew what I had to try to depict. Whether I succeeded is another question.

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Oxford.

REVIEWS

Economy and Society. By TALCOTT PARSONS and NEIL SMELSER. (London: Routledge & Kegan Paul, 1956. Pp. xxi + 322. 35*s*.)

ECONOMIC theory, argue the authors of this book, is a special case of a more general theory of the social system, which has already been developed, primarily by Parsons, Shils and Bales. The authors claim that certain problems which economics fails to deal with can be satisfactorily solved by means of this general theory. More: "The line of theoretical work we are pursuing here can eventuate ultimately in a far more sophisticated classification and dynamic analysis of comparative economic institutions than is possible at present." This task "is sufficient to occupy a whole generation of theorists and research workers representing all the social sciences." Meanwhile the present book is devoted mainly to exploring the general theoretical relations between economic theory and the general theory of action, although at the latter end there are some tentative applications of the general theory to the trade cycle, the consumption function, the investment function and growth.

This is an ambitious programme, and the claims are high. Are they justified? The outline of the general theory of action provided in this book is extraordinarily abstract, and the style, especially in the earlier parts, clumsy and obscure. The frequency of very long words is daunting, the more so in that one is never quite sure whether the meaning attached to them is ordinary general purpose, or some specific technical meaning, and if so, which. Schumpeter's entrepreneur is characterised as an "integrator." The authors concede that most people would think of him as a disrupter of established patterns, but, from the standpoint "of a higher system level, he integrates new combinations into a new equilibrium position." One wonders whether the Kaiser and Hitler were integrators: after all, their wars were followed by peace. Again we are blandly told, in a footnote, that: "This final example indicates that the term encouragement extends for our purpose beyond its common meaning of 'persuasion,' or 'exhortation' to the realm of coercion and direct management." Like volunteers in the Army!

According to the general theory, any social system has to "solve" four "problems" if equilibrium and/or continuing existence of the system is to be maintained. First, a social system is characterised by an institutionalised value system, and it is imperative that the integrity of that value system be maintained. "Tensions" may arise from "strains" in any part of the social situation. The first functional imperative of a social system is thus "pattern maintenance and tension management," which is called *L* for

short. Second, any social system functions in a "situation" external to it. A goal state is a relation between the system and one or more (external) situational objects, which maximises the stability of the system. The system "seeks" goals by controlling elements of the situation. This is called *G*. Third, the seeking of goal states creates an interest in establishing and imposing control over the external situation. This is the "adaptive" process *A*. Finally, the system must "maintain solidarity" between the units (persons or groups) of the system (the basic unit is not in fact an actual individual or group, but a role: the same person may embody several, possibly conflicting, roles, for example as producer, consumer, tax-payer.) This is the "integrative function," *I*.

A, *G*, *L*, *I* are the four basic categories for describing and analysing any system of action. The rules of the game are now further elaborated to introduce the ideas of sub-systems and different system levels. Thus the "economy" is the sub-system of a society, which is differentiated with primary reference to the "adaptive" function of the society as a whole. The economy (and other sub-systems) can be broken down into further sub-systems, and much of the book is given to the elaboration of such further sub-systems and to the discussion of the "boundary" relations between them.

So far this is just a bigger and better set of empty boxes and, given a little terminological flexibility *à la* Humpty Dumpty, one is not inclined to dispute the authors' claim that the analytical elements they have distinguished can be found in *any* society, indeed in any social system. Their restatement of a simple trade-cycle model in *AGLI* language is indeed something of a *tour de force*, forcibly reminding one of Dr. Johnson's observation upon women preaching.

The *AGLI* framework applies indifferently, so it seems, whether the context is welfare economics or positive, value-free economics (in so far as there can be such). I am suspicious of *G* in the explicitly welfare case. The "optima" of welfare economists are accepted by the authors as analogous to their goal state. But, they say, the economists who have tried to get at optima in terms of simple aggregates, or logical constructions, of the optima of individuals, an approach which raises questions of cardinal and ordinal utility, and inter-personal comparisons, have been wasting their time. "The theoretical occasion for drawing such comparisons in the traditional sense does not arise at all, since the categories of wealth, utility and income are states or properties of social systems and their units, and do not apply to the personality of the individual except *through* the social system." This looks like the General Will all over again. "The goal of the economy is to produce income primarily for the satisfaction of consumer wants." Which consumers? And what would the authors reply to someone who said that the goal of an economy was to provide profits for the capitalists?

I was not convinced that the re-classificatory line will be any more helpful in " positive " economics. Among other examples the authors take up the consumption function. Their criticism of Keynes' " fundamental psychological law " is that its derivation is methodologically unsound, and they proceed to derive from *AGLI* an alternative " consumption function," which is a curve, convex as seen from above, with a kink in the middle. I found the reasons for adducing this shape no less, but no more, plausible than Keynes' own account of subjective and objective factors. Curiously the authors make no mention of the reasons why economists have abandoned the original Keynesian form (except as an expository device in simple model building), namely that it did not square with figures for the United States produced by Kuznets some years after the *General Theory* was published. The authors' hypothesis (because that is how it *ought* to be regarded) is insufficiently specified for one to say whether it might fit the facts, not better than Keynes, but better than any of the numerous alternative hypotheses which students of economic behaviour have been offering in recent years. Many of these economists (call them what you will, it does not matter) have introduced explanatory factors which are not " economic " in the traditional sense—age, sex, family size, colour, occupational status, etc. If the authors' object were merely to encourage economists not to stick too narrowly to their traditional lasts I should be with them. The classification of " sciences " is convenient for teaching, arranging syllabuses and examining. When it comes to research the important thing is to study problems, and to use the best tools one can find, or invent, without fussing about which box they come out of. But in the economic illustrations given by the authors, the restatement in *AGLI* terms seemed to me elaborately contrived rather than a natural or suggestive response to the problem in hand. There is all the difference between a fruitful hypothesis and a procrustean bed.

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The Theory of Wage Determination. Proceedings of a Conference held by the International Economic Association. Edited by John T. Dunlop. (London: Macmillan, 1957. Pp. 437. 36*s*.)

The sixth Conference of the International Economic Association, held in Seelisberg, Switzerland, in September 1954, was devoted to a study of problems of wages and wage determination. The organisers had selected with care and skill a group of thirty-five economists from twelve different countries, of whom twenty-one presented papers to the Conference. The participants included economic theorists and representatives of the modern Keynesian school of thought, as well as a strong body of applied economists whose speciality was labour economics. It was thus a well-balanced team.

The title of this volume is perhaps a little misleading, as much of the contents is concerned with a thoroughly realistic treatment of wage determination in its contemporary setting in such countries as Sweden, France, the United States and Great Britain. On the other hand, a number of issues, such as questions of wages policy, did not come within the terms of reference of the Conference.

It would be difficult to find a better subject than this for an international conference of economists. As Professor Dunlop says in his Introduction to this volume:

> "There is a deep-seated intellectual habit . . . for writers on wage determination to generalise from the experience of their own native institutions, be they American, British, Swedish or French. The Seelisberg papers clearly reflect this tendency. The varied descriptions and explanations of wages proffered by economists, puts one in mind of the conflicting impressions of the elephant developed by a group of blind men, each of whom explored a different sector of its anatomy."

The papers are divided under six main headings: I. An introductory survey by Professor J. T. Dunlop, entitled "The Task of Contemporary Wage Theory." II. The General Level of Wages. III. The Impact of the Labour Unions. IV. The Wage Structure. V. The Nature of Bargaining. VI. Labour Market and Labour Supply.

Many of the papers submitted are of high quality, and some of them are of outstanding interest, notably the introductory survey of Professor Dunlop and the contributions of Messrs B. C. Roberts and H. A. Turner (Great Britain), Professors Kerr and Reynolds (United States) and Mr. G. Rehn (Sweden).

The papers were discussed during sixteen half-day sessions, and a record of the discussions, summarised by Mr. D. Hague, is to be found in the last ninety-seven pages of the volume.

It is well known that in comparatively recent years trade unionism has developed apace in the United States, and a great deal of work has been done there by way of investigation into the impact of unions upon hitherto unorganised industries. Some of the results are touched upon in the papers of Professors Kerr and Reynolds. It is, however, extraordinarily difficult to isolate the effects of the unions; and it would be quite possible for two equally competent and impartial investigators to arrive at opposite conclusions on the same set of facts and other data. According to Professor Reynolds:

> "Rees in a study of the fully unionised basic steel and bituminous coal industries, concludes that their wage levels probably rose somewhat less rapidly than they would have under non-union conditions. Sobotka, on the other hand, concludes that unionism in the building constructional industry has raised the wage level of the unionised workers by something in the range of 10 to 20 per cent."

There is, of course, no necessary conflict between the verdicts in respect of these different industries. In general there seemed to be a large measure of agreement amongst those taking part in the Conference that, important as trade-union organisation undoubtedly is for the determination of wages, it is the underlying economic forces which exercise the preponderant role.

Not only the papers but also the subsequent interesting discussions revealed how many important aspects of wage determination are still obscure. No further light was shed on the still unresolved problem of the relative (though by no means absolute) constancy of the proportion that wages bear to the national income. Again, the remarkable experiences of France, where this constancy applies to wages *plus* social transfers (wages seeming to stand in a certain inverse relationship to social transfers) remains unexplained.

Some of the participants appeared to be seeking a new " theory of wages " which would be all-embracing and would explain everything. But surely in the nature of things any such attempt must be doomed to failure. Whether it is a union considering the nature of a claim it intends to submit to the employers, or a workman making up his mind whether or not to leave his present job for a different one, or an employers' organisation deciding what line to take with regard to a particular claim by a union, there is normally a complex set of " endogenous " and " exogenous " factors which go to influence the decision, and which will vary with the attendant circumstances. Professor Shackle, in a very instructive paper on the Theory of Bargaining, was obviously hankering after a theory in this field which could be determinate, though one would expect that the psychologists to whom he would have us turn, would prove to be broken reeds. But what has most struck the present reviewer, in observing the actual process of collective bargaining for many years past, is the incalculability in a large number of cases of the final upshot of the negotiations—an incalculability which in the vast majority of cases has nothing whatever to do with any question of a possible strike. So much can depend upon the way in which spokesmen for the two parties put their case. Employers have been known to end up by agreeing to something which they had fully made up their minds to resist when they started the negotiations. Again, what theory of bargaining could cope with the possibility that the leader of one of the two sides might have had a very bad night just before a critical meeting, or that someone in discussion may make a remark which will violently put up the backs of the other side? If by " determinate " is merely meant that there is an upper and lower limit to the possible bargain and that in many cases the range between the two is quite small, there can be no reasonable ground for objection, except to say that this seems to be stretching somewhat the normal meaning of the word " determinate."

There is no necessity, however, for us to feel defeatist about the present state of wage theory, which by and large came quite well out of the proceed-

ings of the Conference. It would have come out even better if more of the contributors and speakers had stressed the importance of long-run considerations: the mills of long-term economic forces may grind slowly, but through time they grind considerably smaller than is commonly realised. On the other hand, it is also true that a great deal of work still remains to be done to clear up many issues that are still in doubt. Further collaboration between economic theorists and labour economists, along the lines so well initiated at Seelisberg, is badly needed.

Those responsible for contributing to and producing this volume have done a very real service to economics and economists the world over. There is nothing of comparable value that has been published hitherto in this field.

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International Economic Papers, No. 6. Translations prepared for the International Economic Association. (London: Macmillan; New York: The Macmillan Company, 1956. Pp. 211.)

IT is an excellent thing that economists should be tempted, by a dish of such various fruits as are to be found in each volume of the *International Economic Papers*, to go outside their own specialisms and sample the work of other times and other nations in a way they might otherwise never get round to doing. No. 6 in the series is well calculated to jerk almost any reader out of his accustomed rut.

The first paper in this volume is about the early history of the " law of markets " usually ascribed to J. B. Say, but here shown by M. Paul Lambert to have been in the minds of many writers. The long shuffling of incomplete ideas by many different hands, that leads at last to the sudden emergence of a clear pattern, the formulation of an acceptable law that will stand fast, within the limitations of its context and frame of thought, against all critical scrutiny is illustrated by what has happened to the " law of markets " in the course of two centuries. Say's efforts in his contest with Malthus, we may well feel, were not wasted, since even a mistaken or misleading proposition is better than no proposition at all, if it stirs others to criticism and a search for the truth of the matter. In his article M. Paul Lambert shows Malthus as the victor and as one of the long-latent sources of Keynes' inspiration, but his explanation of why Say and all his predecessors were wrong is quite beside the mark.

> " To dispose of the surplus the cobbler and the baker would each seek to alter the rate of exchange of his product in terms of all other products. . . . If, however, overproduction is general, how could all rates of exchange fall? The baker would offer three loaves instead of two for a pair of boots at the same time as the cobbler showed a willingness to exchange one pair of boots for one loaf. The old barter

rate would be re-established and both would be left holding their surpluses."

From this account of the matter everything important seems to be left out, and Say would surely be justified, if he could read it, in dismissing it without ceremony. Amongst the things it ignores are the distinction between stocks of goods already produced (production *ex post*) and plans to produce goods (production *ex ante*); the question in what sense a good is in "surplus" so long as there is anyone who is not completely satiated with it; and the tremendous gulf which separates the analysis of a system where knowledge is in every sense perfect (or else needless) from one where it is not.

In the pure static timeless system, part of whose essence is that everything is perfectly adjusted to everything else and there is general equilibrium, overproduction is evidently excluded by definition. Once we escape from that frame of thought, the question is one about the inconsistency of the plans of different individuals, an inconsistency made possible through their ignorance, that is, their uncertainty. In a barter economy this uncertainty about the future usefulness and exchangeability of particular products might result in people preferring their *own* leisure to the products they could make; in a money economy it results in their preferring *other people's* leisure: instead of labour being withdrawn from the factor market, demand for labour's products, and so demand for labour itself, is withdrawn. Overproduction is possible because in a *money* economy people can dispose of their produce *without having to make up their minds what they want in exchange.* Money, above all else, is a means of putting off decisions, and hence its power to thwart the plans of suppliers. In a barter economy Say was perfectly right. It is in an economy where people can *save money* that there can be "general overproduction" or the appearance of it. It is money which makes it logically possible for people to sell goods without simultaneously buying them; and it is uncertainty which makes them desire to do so: they wish to wait for more illumination, for a clearer view of the future or for an opportunity to rush in and seize a quick profit, by technical innovation for example, before the fog closes down again. Keynes, perhaps, did not say this, but he took us much of the way towards such a formulation. M. Lambert seems to do Say, Trosne, James Mill and others a grave injustice. They were wrong; but their mistake lay, not in believing in the "law of markets" for a barter economy, where it is perfectly true, but in believing that a barter economy was not essentially different from a money economy.

Without wishing in the least to disparage the article by Mauro Fasiani, which quotes Barone's neat incisive proof, using Pareto's then recently invented indifference-curve construction, that income tax inflicts less hardship, pound for pound of revenue, than a commodity tax, one cannot avoid

the feeling that here is a touchstone for the true-blue economist. The man with economics in his blood will, I am convinced, need only to hear this proposition enunciated to declare it self-evident. It may be dangerous to trust to instinct or intuition in economics, but the man who has once got the "feel" of the subject does not really need any argument to convince him that, for example, free trade maximises world income (without necessarily benefiting every individual person, industry or country) or that all economic variables are inter-dependent.

When any question about the Austrian theory of capital comes up, the present reviewer is subject to the strangest mixture of feelings. Long ago the complexity and subtle difficulties of Böhm-Bawerk's construction, with the brilliant gloss characteristically put upon it by Wicksell and the no less exciting but intensely difficult developments by Hayek, wove a spell of fascination which even now I cannot quite cast off. Yet I am sure that it is not worth the modern student's while to spend time on capital theory in the old intricate Austrian sense. Economics depends essentially by its very nature on a certain looseness of ideas (however deplorable this admission sounds, or whatever penalties will fall upon me, I must maintain it). Marshall when he "knitted in wool" knew perfectly well what he was about. We do need such ideas as "capital," "income," "the general price level," which defy exact interpretation. And as to "capital" we need it more than ever in these days when the conditions for development of the under-developed countries are always under discussion. But we do not need the *Austrian* theory of capital. Still less, I think, have we any use for the stationary state, which is the basis of discussion of interest on Böhm-Bawerkian lines. Böhm-Bawerk's second "ground" of interest, discussed with the other two "grounds" in Guy Arvidsson's article, "On the Reasons for a Rate of Interest," was the "under-valuation of future goods." This idea is nonsense. If no man can be in two places at once, still less can he be in two *times* at once, and no objective comparison is possible between the *actualities* of enjoyment of goods now and enjoyment of them at some subsequent date. To-day we are in to-day, and to-day's judgments are all we can compare with each other. A year hence we shall be in a different day, and there will again be no going back in actuality to to-day to make comparison of *actualities*. All that we can compare is *to-day's* judgment of the utility of a good to-day with *to-day's* judgment of its utility another day, and these two judgments are comparable only when they are judgments made in one and the same moment. There can be no inconsistency; "under-valuation of future goods" is an utterly meaningless phrase. When next year comes and we have eaten up our patrimony, we may regret it. But we once judged it satisfying to eat it up. On which occasion were we right, which of the two mutually contradictory judgments was just? A meaningless question; one might as well ask whether it is Englishmen or Australians who walk about upside down.

It is impossible in the space of a short review to comment usefully on everything in such a collection as this. August Lösch's article on " A New Theory of International Trade " from the *Weltwirtschaftliches Archiv* of 1939, the one by V. V. Novozhilov called " On Choosing between Investment Projects " published in the *Transactions of the Leningrad Industrial Institute* in 1939, and Gustav Cassel's " The Principle of Railway Rates for Passengers," dating from 1900, will appeal to widely differing tastes. Yet further variety is provided by Dr. Zassenhaus' article of 1934 called " On the Theory of Economic Planning " and a very recent article by H. S. Larsen on the Danish capital market. It is, however, the last article of all, Schumpeter's " Money and the Social Product," which is to me the most interesting in the book because of its fascinating illumination of the progress which monetary theory has made in the past forty years.

Here we have the Quantity Theory expounded with the greatest care and detail by one of the great economists in the prime of his powers, and one can think only of Frankenstein wrestling with his own monster. On his first page Schumpeter speaks of " Ricardo's classical performance, in which profound insight struggles so heroically with primitive tools." The only puzzle is that a mind of such power as Schumpeter's could be content to spend its efforts on the creaking mechanical gestures of this robot of a theory. Indeed, the Quantity Theory seems always to terrify its expositors into a trembling incoherence. How else can one explain the contradictions of the passage where we are told that the Quantity Equation is " a truism " although " opinion may differ on . . . whether or not it is a mere tautology or identity . . . " " Our equation is not a tautology in the proper sense." Keynes nearly suffered the same fate in the *Treatise on Money*, but Keynes was not one to let a mere identical equality get him down, and by the time the fight was over the Quantity Equation had become unrecognisable. Keynes' greatest service to economics was that he then picked up the wreckage and threw it over the side, and with a giant's heart began afresh and wrote the *General Theory*.

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The Meaning and Validity of Economic Theory: A Historical Approach. By L. Rogin. (New York: Harper & Brothers (London: Hamish Hamilton), 1957. Pp. xvii + 697. 52*s*.)

The intentions of the late Professor Rogin in writing this book are clearly stated in the Preface: " My work is not a conventional history of economic thought. It constitutes rather an exploration of the hypothesis that new systems first emerge in the guise of arguments in the context of social reform " (p. xiii). It appears to be assumed that all theorists have " a practical objective " (p. xiv); the validity of their theory is then

assessed by referring it to their practical interests and their implicit or explicit proposals for reform, if any.

This programme has a certain attraction. It is novel. It is based on ideas which are to some extent plausible. It concentrates attention on the important fact that out of the vast array of information which is the raw material of economic study, only some data, only some relationships are worth analysing; and it reminds us that knowledge of what is worth analysing comes by observing the social and economic structure of the day, the problems requiring solution, the results of previous analysis. But the effect of the following fourteen chapters each devoted to a single economist (there is also one on the physiocrats) is confused and disappointing. There are good things in these chapters, points made which, if not new, are perhaps made too seldom. No one, for example, could read the chapters on Ricardo and Malthus and continue to suffer from what Cannan called the greatest delusion about the history of English political economy, namely, " that the economics of the Ricardian school and period were of an almost wholly abstract and unpractical character." John Stuart Mill's interest in Socialism and social reform is similarly, and rightly, emphasised. But Professor Rogin obviously did not find it so easy to apply his methods to the study of Walras or Böhm-Bawerk. And in the case of Menger the method, in the opinion of at least one reader, is exposed as completely unsatisfactory. Is it true to say—is it even helpful to say—that Menger's brilliant and path-breaking attempt to divest economics of any normative element was due to his wish that nothing be done in the field of social reform? " The restrictions which Menger imposed upon the scope of economic theory served to purge the science of economics of ' dangerous thoughts '; and that is the objective, the public, meaning of his theory " (p. 497).

But if the final effect is disappointing there is much of interest on the way. And there is the curious demonstration through fifteen chapters how even a sympathetic critic writing from an avowedly " relativist " standpoint is apt to praise or blame other writers according to how their views coincide or conflict with his own. To Professor Rogin, clearly, the issue which no economist was justified in neglecting was that of economic fluctuation. This view is probably less common to-day than ten years ago: it is doubtful if it existed between the days of Malthus and of Keynes. Thus there is a relativism of economic criticism as well as of economic theory, a possibility of writing a history of the history of economic thought. But what problems, Professor Rogin has reminded us to ask ourselves, would give meaning and validity to that?

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A Study of Saving in the United States. Edited by RAYMOND W. GOLDSMITH. (Princeton, New Jersey: Princeton University Press (London: Oxford University Press), 1955 (Vols. I and II), 1956 (Vol. III). Pp. 1138 + 632 + 476. 308*s.* the set.)

THAT such a work as this should have been essayed by one individual is itself staggering. Within three volumes, comprising 2,250 pages, are to be found estimates of Personal and National Saving for the United States from 1897 to 1949 broken down by instruments of saving and types of savers, a point-by-point discussion of aims, difficulties and controversial matters involved in the preparation of the data, fresh estimates of national income, preliminary estimates of national wealth and analytic studies of observed variations in savings over time. The whole study is well printed with a minimum of typographical error and presented in lucid prose. The investigation was sponsored by the Life Insurance Association of America and executed by Dr. Goldsmith with the aid of research staff. All in all, it is a remarkable *tour de force.*

Volume I contains the main estimates of savings, together with descriptive commentary on the principal features of the time series. The definition of saving preferred and adopted in this study reads as follows:

> " The current value of the change in earned net worth of all economic units in the nation (or of those forming a group within the nation) including all types of non-military assets with an expected service life of more than one year other than consumer semi-durable goods; excluding all revaluation changes from the calculation; using capital consumption allowances based on replacement cost and spaced equally over the expected life of the asset; excluding discovery values of natural resources and hence depletion allowances on such values; and including the costs of change of hands of existing assets " (Vol. II, p. 70).

This adumbrates many of the controversial issues raised in the conception of saving (and discussion in Vol. II) and the position taken up by Dr. Goldsmith. His approach is essentially eclectic, however, and those who desire to work with alternative definitions will find that Dr. Goldsmith has served them well.

Two distinctive features of the analysis are the preparation of capital consumption allowances based on replacement in lieu of original cost and the recognition that a sizeable portion of consumer durable expenditure should be regarded as saving.

Occasionally one may attack Dr. Goldsmith for his viewpoint, never for his frankness. For example, to this reviewer, one point where Goldsmith errs is in his treatment as saving of costs of redistribution of existing (as opposed to new) assets, but in no sense have the facts of the procedure been disguised from the reader. Nevertheless, he must proceed with care. The user of the statistics of Vol. I must always have cross-reference to the descrip-

tion of Vol. II. What is true for the user applies *a fortiori* to anyone who would manipulate the data to derive series more suitable for his immediate purposes.

The estimates are arrived at by a social-accounting approach. The development of social accounting has been an important one, but we must not allow its convenience to distract us from exploring fundamentals. There is a significant distinction between the search for perfection of measurement within a conventional framework and an assessment of the appropriateness of that framework itself. For example, saving is defined, under provisos, as the change in earned net worth. But what do we mean by net worth? Merely to state that it is assets minus liabilities does not take us very far. What are assets? Is the provision of education facilities which increase the future expected earning power of the saver or his descendants saving or not? In social accounting the conventional answer is "no"—but in theory at least it may well be "yes." This serves to emphasise that saving is in general related to the accumulation of non-human capital only, whereas it may be cogently argued that non-human and human capital should be treated on an equal footing. Such a broad definition could raise a number of further problems. For example, to whom is saving in the form of extra human capital to be attributed—the provider or the beneficiary? The former can never dissave the investment in human capital of another. This brings us to problems of motivation and questions such as whether we should associate saving with an individual or with a family tree.

Now many of these questions are not germane to Dr. Goldsmith's immediate inquiry, and in any event he is aware of them. Nevertheless, one cannot escape the feeling that the early chapters of Vol. II could suggest to the unwary that the foundations are much more secure than in fact they are. For there is little doubt that, in the text, Goldsmith is almost exclusively concerned with the securing of high standards within the convention, and in this his treatment of the difficulties is extremely thorough and well-nigh exhaustive.

The savings estimates have been built up by the aggregative balance sheet method, *i.e.*, by compiling estimates of savings from aggregative series measuring year after year the different forms of saving and dissaving for all saver groups with the exception of corporations, where practical difficulties necessitated an income-accounting approach (the difference between earnings and dividends).

As a check on his estimates, Goldsmith uses four procedures: (*a*) comparison with estimates of others; (*b*) comparisons with other estimates that can be directly related to savings; (*c*) evaluation of possible errors in estimates of savings components and their effects in and on the aggregates; (*d*) comparison with blown-up results of sample surveys.

With his customary candidness Goldsmith emphasises the precariousness

of the estimates and " ventures the guess that the probable error for any one year in the estimate of total national saving, with the definitions used . . . cannot be expected to be less than 10% and is not likely to be above 30% disregarding sign and that the boundaries may well be as narrow as 15–25%" (Vol. II, p. 147). There is, in particular, considerable leeway in the derivation of the saving of corporations and unincorporated enterprise.

One further point, Goldsmith's contribution to the preparation of data lies principally in the regrouping and refining of basic source material often derived by others. In manipulating data or adjudging accuracy these sources will need to be drawn upon.

This study is obviously going to be a main source of historical estimates for many years to come, and countless scholars will be screening hypotheses in the light of the contents. Suffice it is to say that Goldsmith's results confirm the long-term stability of the personal saving–income ratio when durables are included and suggest a slow secular decline when these are excluded. But these ratios exhibit much short-term instability. There is also conspicuous evidence of the growing relative importance of saving in contractual form.

And so to Vol. III, which contains a number of special studies. The reviewer had high expectations, but was on balance disappointed. Three of the six parts contain important estimates of national wealth, income and aggregate value of non-operating assets of private non-financial, non-profit institutions. A fourth contains some experimental econometric studies of the savings function which, save on the score of presenting a well-rounded treatment, would have been better deleted. The two remaining parts are by outside contributors—Dorothy Brady and Horst Mendershausen. Mrs. Brady's paper on Family Saving, 1888–1950, contains much useful empirical information drawn from cross-section studies and the 1935–36 survey in particular. Unfortunately the standard of the text falls far short of what one has been led to expect from Mrs. Brady. Even at a second reading this reviewer finds it difficult to discover exactly what she is trying to say. She stresses the need for a statistical theory of saving which gives considerable rein to random elements. Yet at other stages she emphasises the importance of age, family size, etc., and also that of income or social milieu in which the individual finds himself. In this sense one could say that Mrs. Brady's outlook is eclectic. However, in other ways one senses a closer affinity to the recent " permanent-income " hypothesis of Professor Milton Friedman, wherein savings, income and other variables may be conceived economically as comprising both systematic and transitory components. It is to be hoped that Mrs. Brady will somewhere set out her analysis more explicitly, but in the meantime the grouping and selection of tables is such as to make them worthy of closer study in relation to current disputation on the form of the savings function.

In his paper entitled " The Pattern of Estate Tax Wealth," Menders-

hausen derives an estimate of the distribution of the wealth using the Federal Estate Tax statistics of estates passing at death. From these by multiplication by the inverse of age-specific mortality rates he attempts an estimate of the distribution of wealth among the living population subject to estate taxation. Surprisingly, while similar methods have been extensively employed elsewhere, lack of data has impeded their use in the United States. Mendershausen's study is well presented, with due attention to dangers of bias, though his attempts to obtain national-wealth distributions from these data are flimsily based.

In view of the size and cost of these volumes, it is a pity that Goldsmith's studies were not compressed into two volumes and Menderhausen's and Brady's published separately. The work as a whole is an indispensable source and reference book setting new standards in presentation, description of method and clarity.

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The Lognormal Distribution. By J. AITCHISON and J. A. C. BROWN. (London: Cambridge University Press, 1957. Pp. xviii + 176. 35*s.*)

IN many fields of statistical application it has been noted that skew distributions tend towards symmetry if plotted on a logarithmic scale. It is from this tendency that much of the interest in the lognormal distribution derives. This distribution specifies more than symmetry, however, on the logarithmic scale. It is essentially the distribution of a variate whose logarithm follows the normal law.

Each time the research worker comes upon this problem, he must work out anew the properties of the lognormal distribution or search through a scattered literature, sometimes in fairly obscure locations, for these results. Messrs. Aitchison and Brown have rendered an invaluable service by bringing the whole theory together systematically in a single volume. They have made a very scholarly study of the literature and extracted the important outstanding results in addition to presenting some neat contributions of their own. Their bibliography in the book has turned up some choice selections of which this reviewer was wholly unaware.

The book analyses the mathematical properties of the lognormal distribution and stochastic processes that generate such a law. The lognormal has often crept into applied work as an empirical regularity, but they show how one can go a step further in developing it in specific context from a probability scheme.

A good share of the volume is devoted to the problems of statistical inference in connection with this distribution. These are problems of testing

empirical distributions against the lognormal hypothesis and the estimation of its parameters from sample data. The author's treatment of *truncated* and *censored* distributions is especially valuable in this connection. A major contribution is in the use of artificially constructed samples for explaining and studying the inference problems.

There is a brief discussion of numerous fields of application in which the lognormal distribution has been used. Extensive treatment is given to profit analysis, the distribution of income and the theory of consumer behaviour. These applications are of great importance to economists. Other applications in economics are associated with the name of Gibrat, who studied the distribution of industrial characteristics with the lognormal tools. The lognormal distribution is sometimes called the Gibrat distribution, but the original developments actually antedated this work by many years.

Economists will find the discussion of income distribution from the point of view of the lognormal hypothesis quite interesting. A word of caution, however, about the very approximate nature of the distribution in this area is needed. In many sample data which this reviewer has examined there are systematic and easily recognisable departures from lognormality. The graduation is fair, but there is a real question whether the closeness of fit is good enough for the applications to be made in statistical economics. It definitely appears to be worth while to search for refinements.

Some form of logarithmic transformation is often useful in Engel curve analysis; therefore a full use of the neat properties of the lognormal distribution is natural. The problem of aggregation of micro-economic Engel curves is facilitated in these situations. Aitchison and Brown go even farther in their work on consumer behaviour. They develop a system of *sigmoid* Engel curves represented by the cumulative lognormal distribution.

While the book is certainly of high calibre and a very welcome addition to our fund of knowledge, it is not without its faults. The authors apparently go astray on the matter of maximum likelihood estimation. They find it difficult to derive maximum likelihood estimation equations for the arithmetic mean and variance of arithmetic values of a variable following the lognormal law. Since they develop a pair of equations relating these two moments uniquely to the geometric mean and variance of logarithmic values, it is a very simple matter to derive maximum likelihood estimates of the former pair from the obvious maximum likelihood estimation equations of the latter pair. Aitchison and Brown have overlooked the important *invariance* property of maximum likelihood estimates. Their exposition could have been much simplified on this score.

When they come to maximum-likelihood estimation for the three-parameter form of the lognormal distribution they remark that "the maximum-likelihood estimators cannot be assumed to possess the desirable properties of consistence, asymptotic normality and minimum variance

without special investigation." Surely they do not want to deny the wide generality of the basic theorem on maximum-likelihood estimates.

In the aggregation of Engel curves of savings, Aitchison and Brown suggest that a log–log form would simplify the problem if a lognormal form of income distribution is assumed. This form of the savings function is, however, quite unacceptable and was deliberately avoided because of the fact that savings are frequently negative.

These minor faults are all on matters of detail that can easily be rectified and should not draw one's attention away from the obvious merits of this fine contribution.

L. R. KLEIN

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Introduction to International Trade and Finance. By LORIE TARSHIS. (New York: John Wiley (London: Chapman & Hall), 1955. Pp. x + 536. 48*s*.)

TRANSPARENTLY well-intentioned, fair minded and informed, the author of this *Introduction to International Trade and Finance* engages the sympathy of the reader from the start. But there are more than five hundred pages of text, and it is reasonable to ask in what sense do they constitute an introduction to the subject.

In his Preface Professor Tarshis says that he has written for undergraduates . . . a balanced though certainly elementary account . . . intended to teach one thing—a method, call it economic analysis—and not a conclusion.

The first sense, thus, in which Professor Tarshis conceives his book as an introduction is that it should be at an " elementary " level of exposition. An immense labour has been put in to accomplish just this. For the topics treated are all-embracing, and each is covered in simple language with a wealth of easy numerical example and some illustrative statistics. The foreign-trade multiplier appears early, and somewhat later the doctrine of comparative advantage; thereafter the balance of payments is interpreted, and the ambiguous notion of more or less " satisfactory " equilibrium is suggested. Variants of the mechanism of the foreign exchanges follow, and the limitations of usefulness of the concept of purchasing-power parity are set out. How cyclical fluctuations in employment and national incomes may be propagated, and what countervailing measures may be helpful or unhelpful, are discussed; and the discussion moves onward to considerations of longer term relative structural changes. The latest forms of international institutions concerned with trade and tariffs, with payments across the exchanges and with foreign investment, are then described. Finally, a short chapter gathers together the leading interests and obligations of the United States in the World Economy. Small wonder that such range of

content, translated for those with not much more than a secondary school education, results in an omnibus volume. The last word as well as the first word on the subject is said—well said at the chosen elementary level—for those readers who stay the course.

But what of the second sense in which Professor Tarshis conceives his book as an introduction—the thing, economic analysis, intended to be taught? The student will have been so overwhelmed by the kindness and fullness of the common-sense explanations given him that he would seem very unlikely to want to start all over again at a more intellectually exacting level. It is true that he has been presented with certain arresting symbolic expressions, but these are not formally derived or developed. Also he has been shown some free-hand graphs, chiefly of demand and supply coming together. But he has not been introduced to any method requiring strict definition; nor has he been forced to practise strict logic in sustained argument. He should have learnt that the issues are complex, and that circumstances alter cases in matters of policy. But it would seem quite possible, if he means to tackle the subject in earnest, that he would do better not to approach it replete with so vast a store of preconsidered knowledge.

M. T. Hollond

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Cambridge.

Common Sense Economics. By L. Albert Hahn. (London: Abelard-Schuman, 1957. Pp. xvi + 244. 18*s.* 6*d.*)

Dr. Hahn is something of a curiosity. While most economists of his generation were painfully or joyfully making the pilgrimage from a classical to a Keynesian position, he made it in reverse. In the 1920s he was anticipating Keynes; in the 1930s and 40s he was repenting and recanting; to-day, in *Common Sense Economics*, he states his present, neo-classical view of economic relationships. Beginning with Crusoe economics—the isolated producer "dealing" with Nature, labour against product—going on to the stationary state, thence to the changing economy with fixed money supply, he isolates the rôle of flexible money and credit and of the expectations which they engender and demonstrates the impossibility of pursuing full-employment policies without eventually paying for them with a resounding crash—or with hyperinflation. "Common sense," as against "illusion," demands an end to the modern obsession with effective demand, a Bank Rate responding repressively to the first indications of boom, a total renunciation of deficit finance, and lower wages to cure any consequent unemployment.

It is worth looking at the general nature, as well as the particular merits, of the arguments on which these familiar neo-classical conclusions are based. They are mostly a matter of simplified and selected psychological assump-

tions, such as every economist must initially make, but which the wise man carefully checks for realism before passing from elementary exposition to advice on practical policy. The difference between Keynesian and classical theory lies less in a switch of attention from particular to general analysis or in the use of new conceptual tools, important and transforming as these are, than in the recognition of a different and wider set of economic determinants among the facts of human behaviour; such as the fact that wage-earners will accept a cut in real wages in circumstances where they will resist a cut in money wages, the fact that individuals whose incomes are increasing tend to consume a lesser proportion of each increment, the fact that the possession of a handy store of liquid assets is felt by most people to be a good thing in itself. Dr. Hahn's attack consists for the most part in a denial that these facts either exist or, existing, are important. Wages pay, in real terms, for the disutility of labour; that is that. Higher incomes do not mean lower proportional consumption, except perhaps very temporarily. Liquidity preference is a useless concept; the keeping or spending of cash merely reflects the consumer's or business-man's estimates of the current and future price-and-cost situation. Supporting these arguments, he scores some undeniable hits. Sad experience shows that it simply is not possible to give the propensity to consume a numerical value and use it as a reliable element in economic forecasting; too much depends on the unpredictable, socially conditioned balance, in millions of minds, between a complex of material aspirations, on the one hand, and a desire for security, on the other. The notion of a demand for liquidity dependent exclusively on the rate of interest similarly looks very unreal once one turns from the behaviour of professional investors to that of the mass of the public, whose liquid-asset-holding habits are much more a matter of the current, and variable, Done Thing than of continuously calculated economic advantage. Most important, the emergence, with full employment and prolonged experience of rising prices, of " real " as against monetary calculations of advantage—calculations of the worth of a wage, a contract or the buying power of a mass of liquid assets—surely demand that Keynes' cavalier dismissal of Wicksell and Hayek (*General Theory*, Book IV, Chapter 14) be reconsidered. It is time for a clever dog to go down, however murky the waters, and ease the wild duck out of the weeds and rubbish.

Dr. Hahn, however, is not that clever dog. If Keynes' assumptions fall short of perfect realism, those to which he uncritically reverts fall far shorter. There is the competitive assumption that all employers are always engaged, flat out, in reducing costs. (It follows that, since no margin of energy exists for the attainment of greater efficiency, every increase in wages must infallibly reduce employment.) There is the dogmatic denial that money wages can ever remain stable while prices rise. (It follows that inflation does not merely set in with full employment, but follows from every attempt to achieve it.) There is the even odder assumption, unstated but implicit,

that while production must precede sales, orders do not precede production. (It follows that the multiplier is a myth, since the income of any one period can be spent only on the irrevocably fixed production of a previous period.) And there is the enormous negative assumption that working-class solidarity does not matter; that the willingness or unwillingness of a man to accept, along with a lower money wage, the stigma of a blackleg, is identical with his elasticity of demand for income in terms of effort. Beside this piece of unrealism, the fact that Dr. Hahn does not begin to deal with Keynes' careful analysis of the effects on employment of a general lowering of money wages is of minor importance—as are various other instances of superficiality, unsupported assertions and occasional bad logic.

It is all rather a pity. Dr. Hahn has his finger on certain weak points of the current economic creed. Of him it can be said, as Keynes said of Major Douglas, "He is entitled to claim, as against some of his orthodox adversaries, that he at least has not been wholly oblivious of the outstanding problem of our economic system." But few, among the orthodox of an earlier day, paid any more attention to Major Douglas than was needed to controvert his obvious absurdities; and Dr. Hahn courts the same destiny.

HONOR CROOME

Claygate.

Agazdasagi Vezetés Tulzott Központdsitása. By JANOS KORNAI. (Budapest: Kozgazdasagi es Jogi Konyvkiado, 1957. Pp. 207.)

THIS work, the title of which may be translated as "Excessive Centralisation in Economic Administration," was sponsored by the Institute of Economics of the Hungarian Academy of Sciences, and accepted as the author's dissertation for the degree of Candidate of Economic Science in September last year. As the Preface tersely comments, it was delivered to the printer in mid-October, just before the Revolution at the end of that month. As the author remarks "it would not have been in good taste to modify the text" in the light of events, and it was published unchanged in the following spring. It is a fascinating piece of work; essentially well-meaning and sympathetic towards the basic features of the tortuous socio-economic system which led to the explosion of last October, but at the same time—unintentionally—a damning indictment of it.

Mr. Kornai, striving throughout to restrict his scope and to lower his sights, examines the working of centralised planning in the Hungarian leather, shoe, wool and cotton textile industries. His intent is description on a practical plane. However, the shadows of many problems of pure theory, of profit- versus output-maximisation, "entrepreneurial" expectations, forecasting, games and bribery, welfare economics and so on stalk the whole book. As the description gathers momentum, analysis creeps into it, and the reader is priviledged to witness the process of the author stumbling across the basic principles of non-Marxian economics, following

them up some of the way, stopping short of the ultimate logical implications and leaning over backwards to regain his *bien-pensant* balance. Considering the paucity of the tools which he allows himself to use, the analysis is quite remarkably sound in most places.

The first two chapters deal with the then existing system of *Instructions* and *Incentives*, whereby the State seeks to direct the conduct of the industrial firms it owns. The sum of Instructions is the *Plan* expressed in the form of a set of *plan indices* relating to volume of output at fixed prices, product breakdown of output, quality measured by " objective " standards (" subjective " standards, such as whether the shoe is a good fit for the average citizen's foot, whether the garment is pleasing, the pattern fashionable and the like, are not used), and to the production function (inputs used per unit of output). The latter group of indices is set partly in physical and partly in value terms (such as permissible cost of production, permitted " wages fund "). About forty such index numbers are prescribed for the typical Hungarian light industrial firm, 100% fulfilment of each being technically obligatory.

Two major ways are available to ensure fulfilment. One is the use of " administrative means," such as fines, dismissal of executives and, in more serious cases of neglect, criminal proceedings. The other is the system of Incentives—in practice, bonuses paid to the decision-makers in the firm, the so-called " triangle " of director, chief engineer and chief accountant (lesser employees may be on piece-rate wages or on a flat salary, and may get bonuses either automatically or at the director's discretion). The fulfilment of only two main indices—money volume of total output and planned " cost-of-production reduction "—is rewarded by bonuses; the latter index has generally a lesser weight and is so intractable for planning purposes that its fulfilment in practice varies between 3 and 200%. The other thirty-eight or so indices have no financial sanction, and may or may not have an administrative one. Formally, therefore, the firm's " executive triangle " must solve a maximisation problem with one clear-cut and one ambiguous maximand, and with about thirty-eight side conditions which may or may not be enforced, in the sense that violation has an uncertain sanction. One wonders whether capitalist entrepreneurs have much reason to envy communist directors for their immunity from the " inevitable crisis."

Due to imperfections of foresight in the drafting of the Plan, the main indices may turn out to be impossible to fulfil, or their fulfilment may be demonstrably harmful to the economy. As failure to reach 100% of an index involves total loss of the corresponding bonus, which is normally a fifth to a quarter of the triangle's total income, a " fetishisation of the 100% " results, the maximand being discontinuous. This leads to wasteful " production drives," to switches between labour-intensive and material-intensive products and to the use of countless devices, all strictly within the letter of the law, for " cooking " stock records, production schedules, the timing of

payments and so on. On the other hand, if the room for switches and "cooking" is too small to enable 100% to be reached anyway, the firm "gives up" and goes slow, for once it is clear that it will fall short of a target, it makes no difference to it by how much it does so. In addition, a process of intricate bargaining develops between the firm, on the one hand, and the Trust, Ministry or Planning Board officials, on the other, about the setting of plan targets, since the lower the target, the greater the probability of the bonus. Moreover, though overfulfilment of a target carries a higher bonus, it may at the same time induce the Ministry to prescribe a higher one in the next plan, reducing the probability of future bonuses. This is not a mere time-preference problem for the director, for he is liable to be transferred from one firm to another, the chances of a transfer depending both on his performance and on those of other firms in the same industry.

At its best, the given system of Instructions and Incentives may succeed in driving industry to maximise one index number, the money volume of output at fixed prices. The author recognises that this need not coincide with the maximisation of welfare, however defined, if only because prices fixed for industry and prices fixed for consumers by the State distributive system bear no particular relation to each other. Firms are not penalised for producing, and often do produce, goods which prove totally unsaleable, while shortages of other goods are no less common. A few tentative references are made here to the working of a market economy with consumer sovereignty, though it is stated that the socialist system has the compensating advantage of higher utilisation of capacity. Inter-firm relations seem also greatly distorted under the given system, but neither the resulting anomalies nor the lack of flexibility and mobility and the chronic shortage of raw materials due to excessive investment in fixed at the expense of working capital, appear to be inherent in centralised planning.

A detailed examination of these matters is provided in Chapters III and IV on the "Joint Effects of Instructions and Incentives" and "Inter-firm Relations: The Firm as Buyer and Seller." The fifth and most explicitly critical chapter on "Centralisation as a Socio-political Problem" moves on a somewhat more abstract plane, and seeks to trace the system of economic administration prevailing down to 1956 to its political roots. Stalin's *dictum* is quoted: "Our Plans are not predictions, nor guesses, but *instructions*." "Bureaucratism" is shown to be a logical consequence, and the fear of any spontaneity inevitable.

The final chapter deals with current plans for reform, suggesting that the root causes of inefficiency, waste and loss of welfare are not really tackled by them. It is not explained how the root causes could be removed without abandoning the system which combines State capitalism with price-fixing. The author, perhaps understandably, advocates "tenacious theoretical work, long debates."

An interesting postscript to the book is provided by a very recent

Hungarian Government ordinance abolishing the former system of plan indices in light industry and replacing it with only four index numbers, the ranking one being, quite simply, the total profit of the firm.

A. E. JASAY

Oxford.

The Sterling Area in the Postwar World: Internal Mechanism and Cohesion, 1946–1952. By P. W. BELL. (London: Oxford University Press, 1956. Pp. 478. 63*s.*)

THIS is a lengthy and formidably industrious addition to the large-scale surveys of the Sterling Area which seem to be more popular in America than in the Area itself. The author says it was originally a doctoral dissertation for Princeton University completed in 1954, and the statistics on which it is based are for 1946–52. Professor Bell regards the views of British writers on the affinity and the harmony of interests between members of the Area, and the freedom of payments inside it, as inaccurate and misleading, and the rather inconclusive conclusion of his long examination is that there is a lack both of good reasons for overseas members to belong to the Area and of better alternatives for them to choose.

As might be expected, he treats controls on the convertibility of sterling as the " most significant " of the changes since 1939, and in criticism of " dollar pooling " he quotes the late Dr. Harry White: " it does mean that many American producers are not getting a fair chance to sell in sterling area markets." Did other Americans, we might wonder, get an unfair chance? For certainly all available dollars have been paid to somebody. The greater part of the book, however, deals with " intra-Sterling Area " relations, and the overseas members, the O.S.A., are divided into two groups, " monetarily-dependent regions," and " monetarily-independent countries." The former group comprises the colonies and Ireland, and is held in " monetary bondage " by the United Kingdom; the second group consists of all other members, and these suffer drawbacks under the Sterling Exchange Standard which differ only in degree from those of the colonies.

The monetary differences between the two groups is that the independent countries have their own central banks, while the dependent regions—except for Ireland—have currency boards, and the difference is important. But unfortunately Professor Bell is largely misinformed about the position in the colonies. He describes the currency board as " the central monetary authority," which it is not, and he makes " automaticity of the currency board's operation in the foreign exchange market " a distinguishing characteristic of the colonial currency system, although the board does not deal in foreign exchange, and issues and redeems currency at the request of the banks, not on its own initiative. On the basis of the same error, West African Currency Board commissions on the issue and redemption

of currency are listed in a table of "Telegraphic Transfer Rates" from which they differ in amount and function. Professor Bell has been resourceful in filling the gaps in his knowledge, and one improvisation attributes to a colony which does not belong to a currency board "a local currency representative and a Crown Agent in London." A number of such points, trivial in themselves, give a cumulative impression of surprising neglect of the facts; for instance, the Malayan note issue is quoted in £s. when it is in Malayan dollars of 2*s.* 4*d.*; we are asked to attach price and income significance to increased circulation in Malaya and East Africa without mention of the important point that the geographical area of each of these boards increased in the years mentioned. For commercial banks in dependent regions, the book offers a choice of procedures quite unrelated to the actual methods of meeting currency requirements. And Professor Bell is consistent in conflict with the facts when he says that "no measures are available to enable the colonies to utilise their accumulated sterling balances at least in part for development purposes." Most government balances not earmarked for specific purposes were allocated to the Ten Year Development Plans of various colonies, and even part of the currency funds have been released. But is it a good case for this use of balances to say that those allocated under the Colombo Plan "are expected to be *dissipated* by 1957?"

The sterling balances are treated as the chief disadvantage of the Sterling Exchange Standard, not only for the colonies, but also for the independent overseas members of the Area. "Both groups must bear the burden, in the form of imports foregone, of accumulating balances necessary for the working of the system," while "Great Britain normally has 'unrequited exports' only following some period when there was enjoyment of 'unrequited imports.'" The "normally" should be noted, as one might otherwise regard this as too simple an explanation of the balances of 1946–52 with which the rest of the book deals. At the end the author suggests that attention be given to alternatives which "might offer members the opportunity of utilising even working balances for development." This is an opportunity that might appeal to others besides the O.S.A., but unfortunately we are not given even a model of how it would operate. With a section on "Disturbances in the Balance of Payments and the Automatic Adjustment Mechanism under an Exchange Standard" as the basis for analysis of price–income effects in the several members of the Area, Professor Bell finds a second disadvantage, or "cost," to overseas members in "domestic repercussions from balance of payments disturbances greater than would have occurred under flexible exchange rates." He does not consider the possibility that the monetary authorities in the various countries might not have believed in the efficacy of flexible exchange rates for the internal policies of development, full employment, industrialisation and so on, which their governments had introduced, indeed, he does not recognise the existence of such policies. But it can no longer be denied that India

had the right to "pursue development with inflation," although the "generally favourable experience" of Pakistan's appreciation in 1949 is more open to doubt. For Professor Bell, however, flexible exchange rates have merits that every country would enjoy if it were free, and when he concedes that these are more debatable for colonies, it is on the shaky ground of the "greater importance of direct equity investment in these areas." It is not on any measurable basis that equity investment can be said to be more important in West Africa than in the Union, in Fiji than in Australia; and paradoxically it is for Malaya that he would relax the rigid parity with sterling, although among the colonies, Malaya is an outstanding example of equity investment.

If this falls short of either an explanation or an epitaph for the Sterling Area, it nevertheless draws attention to the need for clarification of certain problems inherent in the use of one country's currency for international purposes by several other countries.

IDA GREAVES

Chicago.

The Labour Government and British Industry, 1945–51. By A. A. ROGOW, with the assistance of PETER SHORE. (Oxford: Basil Blackwell, 1955. Pp. xiii + 196. 18*s.*)

WHEN the Second World War ended the Truman administration in the United States set to work to consolidate the Fair Deal, the Attlee administration in Britain to establish the Welfare State. There was no substantial return in either country to "normalcy." Instead there was a conscious determination to show that social justice and a redistribution of power between the classes (albeit not complete) could be achieved without resort to totalitarianism. The advance of Communism in Western Europe, which had been notable in Italy and France and far from imperceptible elsewhere, was checked by the Marshall Plan, the Truman Doctrine and the creation of N.A.T.O.; but these institutions could not have been created—certainly not sustained—had they not been based upon these new democratic political and economic foundations.

Mr. Rogow does not claim to tell the whole story of the Labour Government of 1945–51. He sets out to examine only one section of its achievements—its relations with industry. But it is not possible fully to explain the imperfections which his examination reveals if one does not recognise the magnitude of the task with which the Government was faced. There was the job of reconstruction after total war—the shift of man-power and resources upon an unprecedented scale in a far shorter time than their original deployment occupied during the War. There was the massive Parliamentary task of drafting and enacting almost innumerable Bills for nationalisation of more than half a dozen major industries as well as reconstructing the national system of health and insurance. There were the

budgetary and fiscal problems of redistribution of income; of the change from a debtor to a creditor position in international trade; of carrying out a full-employment policy with the aid of a Treasury, Bank and Board of Trade which had been publicly declaring for half a century that this was none of the Government's business.

Of course, in these circumstances the Government's achievement in the field of industry was far from satisfactory. Mr. Rogow is a sympathetic critic, and I find most of his account both well informed and fair. He puts his finger accurately on two outstanding weaknesses or failures. First, the Government relied heavily for the administration of controls and of nationalised industries upon persons who had no faith in planned economy or social ownership. Second, it failed to tackle with sufficient skill or boldness the task of explaining its aims to the public and creating goodwill for its policies; and it allowed itself to be beaten badly in this field of "public relations" by "Mr. Cube" and his followers. Mr. Rogow is an American, and is therefore more easily surprised than an Englishman might be by a government which left so many key decisions to be taken by or on the advice of its political opponents and which permitted private industry to spend shareholders' money lavishly on political propaganda while severely restricting anything of the sort on the part of the public sector; but even an Englishman, if he knows our English history, must be astonished by the tenderness with which the Labour Government reacted to the accusation of "jobs for the boys."

No doubt these were errors of judgement, due perhaps to lack of confidence in the administrative ability of comparatively untried men or to a touching faith in the special mystique possessed by the white knights who adorned the boards of so many public companies. More serious, and possibly of lasting importance if there should be another Labour Government, was the failure—not absolute, but relative to the dimensions of the problem to be tackled—to build up a group of trained and properly qualified officials capable of seeing the problems of the economy as a whole and advising Ministers effectively on central planning. True, the ineffective Steering Committee which had permitted an optimistic galloping off in every conceivable desirable direction, was succeeded after a couple of years by the Economic Policy Committee which did a great deal of resolute "slashing"; but even its achievements were too often based upon a mere requirement of the same percentage of "cut" by each Minister who had received an allocation.

Mr. Rogow's analysis in detail of the problems of planning, control and organisation is well done and very well worth reading. His chapter on Public Relations is stimulating and suggestive, though I think he is somewhat less than fair to Sir Stafford Cripps' effort in his dynamic earlier years of office: not to mention the giant posters, "We Work or Want," seems a strange omission. The chapter on Industry and Labour is disappointing.

Mr. Rogow thinks that profit-sharing and co-partnership are "popular" in Britain and devotes some space to them; but he does not mention the N.J.A.C. or the N.P.A.C.I.! His major conclusion is that "so far as the future is concerned, this analysis suggests that the issue of co-operation or conflict will be joined at every point at which power interests, rather than property interests, are sharply opposed." If that be true, the omission of a discussion of the two agencies in which organised labour and organised employers meet to discuss with the Government the central issues of power and economics is very remarkable. As Mr. John Strachey says in a foreword, Mr. Rogow has made a start—a good start—in the analysis of the Labour Government's experience. There is still plenty of room for further exploration.

H. A. MARQUAND

London.

Industry and the State. By P. SARGANT FLORENCE. (London: Hutchinson, 1957. Pp. 196. 10*s.* 6*d.*)

THIS is a further volume in Hutchinson's University Library series. As the title suggests, it is mainly concerned to trace the impact of state policy and activity on industry—the term industry being "confined to activities, apart from agriculture, resulting in products and not services" (p. 14). The subject matter is arranged according to the relationship of the State to the various groups involved in industrial activity—as a protector of one group against another (labour against employer, consumer against producer and so on); as a partner with industry to serve the common interest in efficient production (conciliation, development councils and the like); as a provider of information and services for industry; as a direct participant in production where industries are nationalised; and as a controller of industry as a whole (location of industry, control of capital issues and similar controls). There is doubtless much to be said for such an arrangement. It does have the effect, however, of separating the treatment of what most readers will regard as closely related subjects and vice versa. Thus, for example, Wages Councils are dealt with in the same chapter as the Companies Acts and anti-monopoly legislation, whilst joint consultation and conciliation are to be found elsewhere.

All this is prefaced by a six-page chapter on the "ethics, science and art of State policy in industry" and a long chapter setting out the historical background of state intervention. The former is not to be recommended to those (like the present reviewer) who are becoming allergic to the term "value-judgment." The latter is remarkable for a long table showing in parallel columns industrial legislation and events contributory thereto since 1800. On the contributory side a good deal of selection has been necessary and has produced some odd results. In the realm of ideas Harriet Martineau and Ruskin find a place but not Marshall or Pigou. One would

have thought Marshall's influence on our handling of monopoly problems and Pigou's influence on labour policy to have been quite considerable. Coal-mining legislation is set out in one column but with no mention of the Reports of the Sankey and Samuel Commissions and the Lewis Committee in the " contributory " column. It is noted that birth-rates started falling (1876–80), but what exactly this has contributed to is not clear. Professor Florence has a great gift for tabulation and classification, but it can be over-done. The simple statements made on p. 65, for example, are not made easier by being dressed up as physiological routes, psychological routes, inter-industry transfer routes, inter-firm transfer routes, reorganisational routes and transfer plus reorganisational routes.

The book is extremely comprehensive—perhaps too much so for clarity of exposition. Every form of State activity which can possibly bear upon industry is brought in at some point or other—even unemployment insurance, taxation and control of the capital market. Some institutions, such as joint industrial councils, the Finance Corporation for Industry and the Industrial and Commercial Finance Corporation, could justifiably have been omitted.

This effort to get everything in has limited the usefulness of the book in several ways. Some important aspects of the subject (such as location of industry) have received only brief treatment. Also it has cramped the author's style in following up some useful ideas set out in his philosophy of state intervention. One would like to have seen some generalisations on the aims, implications, forms and limitations of state activity in the industrial field more consistently followed up.

There is much of value in this book, but the average reader may be forced to work too hard to find it. The author is easily distracted from his main theme. The references to wages policy or price policy of nationalised industry might have been more limited, and it seems difficult to justify a couple of pages on the rewards to risk-bearing. The style of writing is often obscure. Two examples must suffice. " The fact about industry perhaps most important in State policy is the comparatively low level and narrow section where industrial decisions are made " (p. 16). " Since 1949 there has been a spate of revisions of this (coal) output target; the Ridley Committee upward, many economists downward " (p. 164).

It is difficult to sum up the merits of this book. So many worthwhile ideas and relevant facts are packed into less than 200 pages that it is from some points of view a considerable achievement. But few stu lents will read it with pleasure, and only the more able and industrious with profit. This is a pity, since very few economists can write with greater wisdom and authority on this subject than Professor Florence.

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United States versus United Shoe Machinery Corporation. An economic analysis of an anti-trust case. By CARL KAYSEN. (Cambridge, Mass.: Harvard University Press (London: Oxford University Press), 1957. Pp. 404. 52*s*.)

THIS book sets out an economic analysis of the issues involved in and arising from the Civil Anti Trust suit brought by the United States against the United Shoe Machinery Corporation under sections 1 and 2 of the Sherman Act. The material (in the book) is derived from Professor Kaysen's original memorandum for the United States District Court of Massachusetts. The major issue of the case was whether the U.S.M.C. monopolised the shoe machinery and shoe factory supplies markets, as the U.S. Government alleged.

This book is a history of the mechanisation of the shoe industry. With it should be read " The Opinion of the Court " on the same case written in lucid, limpid English by Judge Charles E. Wyzanski Junior. Professor Kaysen was a professional economist who was appointed Law Clerk to Judge Wyzanski to act as his economist assistant in connection with the trial of the U.S.M.C. case. His duties were to sift the evidence, to consider economic criteria embodied in the basic policy of the Anti Trust laws and to advise the Judge thereon. Professor Kaysen's book is less easy reading than the Opinion, but it gives the surround and background, the before and after, of the opinion. The bulk of the book is an economic appraisal of the evidence before the Court.

Many things come out in the book. There is the fever of invention of shoe machinery in the last third of the nineteenth century. The shoe industry has been mechanised within the lifetime of men living to-day. Broadly speaking, shoe machines are fed by hand and not automatically, in other words, the industry is still a hand industry but using machines to perform the operations.

The Sherman Anti Trust Act was passed in 1890 and subsequent to that in the next ten or fifteen years there were a great number of mergers throughout the United States, of which the formation of the U.S.M.C. in 1899 was one. The U.S.M.C. merged the interests of five shoe-machinery manufacturers, of whom three were the dominant companies in the principal shoe-machinery groups at the time. At the time of the merger the U.S.M.C. controlled the major share of its market, say 70% or greater. Subsequent additions by purchase and its own natural growth raised it to the level of about 85% of the market, at which figure it has been stabilised for some time.

The shoe industry in the wealthier countries is relatively a stationary industry. During about two-thirds of the period of its mechanisation, that is from 1900 onwards, shoe machinery the world over has been dominated by or largely based upon the work and development of the U.S.M.C. This

is a tribute to the force of the idea created by the men who in 1899 set up the U.S.M.C. merger. The system of control over the shoe industry which they set up to give them the power to work out their ideas was the so-called " tied lease " system. The U.S.M.C. did not sell its machines to the shoe manufacturer, it leased them to him. In the tied-lease system the shoe manufacturer, to use their machines at all, had to use all of them and no others. The stringency of this system was relaxed in America about thirty-five years ago, that is to say the tying clauses were removed. One of the results of the leasing system is that the shoe industry has been serviced with machines in better order, better maintained than is the case in similar industries where outright purchase of machines is the rule.

One of the things brought out in this book is " how you start so you go on." The merger of 1899 and the leasing system was built up around a group of key machines whose use was essential to most types of shoe production. To this day those same key machines or their improved and modified successors still dominate the trading system of the U.S.M.C.

One use the U.S.M.C. has made of its power has been to set up a first-class research organisation. It appears that the use of this research organisation to improve the machines on which the dominance of the U.S.M.C. is based is one of the factors in retaining its position through the last sixty years. During the last war the research organisation did valuable work for the U.S. Government. The application of the efforts of the research and development to the shoe industry has naturally been controlled by the commercial policy of the U.S.M.C. There are indications that the smallness of size and the lack of growth in the shoe-manufacturing industry has restrained somewhat the U.S.M.C.'s research organisation from working out and applying revolutionary concepts.

Under the various Anti Trust laws the United States has fought three cases against the U.S.M.C. First, in 1911 on general monopoly grounds; the United States lost in this case. Second, in 1915 to break up the tied-lease system outlined above; in this case the United States won. Then third the present case, which the United States won. The broad decision in this case is to allow shoe manufacturers to buy their shoe machines as an alternatives to leasing, and to release shoe manufacturers from the obligation to employ U.S.M.C. operatives for maintaining their leased machines. No attempt was made to split up the shoe-machinery supply business, it being held that such split up would damage the shoe industry.

It was held that the two steps of allowing shoe manufacturers to purchase their machines instead of compelling them to lease them, and allowing them to do their own machine maintenance if they so wished, would give encouragement and greater freedom of action to competing shoe-machinery manufacturers.

To reduce the hold which the U.S.M.C. was thought to have over the shoe-manufacturing industry, they were compelled to hive off and separate

and sell to a different company much of the shoe-components supply industry which they had built up over the course of the last sixty years.

By these steps it was expected that the market power in the shoe industry of the U.S.M.C. would be reduced. There is some indication that the U.S.M.C. is now diversifying its excellent research and engineering skills into other trades.

What the outcome will be we cannot tell; "the future's not ours to see." It was a bold move to disturb and try to break up the market power of a company which has dominated the shoe-machinery industry of the world for two-thirds of the time during which that machinery had been in being.

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Street.

Concentration in Canadian Manufacturing Industries. By G. ROSENBLUTH. (Princeton, New Jersey: Princeton University Press for the National Bureau of Economic Research (London: Oxford University Press), 1957. Pp. xv + 152. 28*s.*)

THE National Bureau of Economic Research who sponsor this study as the sixty-first of their general series, continue to put us in their debt. Professor Rosenbluth has set a model for the analysis of Census of Production data to obtain trends and general characteristics in any country's industrial structure. Concentration and changes in concentration, that is, the number or proportion of firms and plants, which produces or employs a certain proportion relatively to their whole industry, are the main themes—themes important enough as indicating possible monopoly conditions; but other important themes are involved. There is, in particular, the measurement of the absolute size of firms and plants and changes in their sizes.

The author finds (pp. 17, 35–7) that at any one time, as might be expected, the degree of concentration in an industry depends mainly on the average size of its firms; but a surprising fact brought out in this book is the difference in the relative and absolute trends, at least in Canada. Relatively to the size of industry plants have not increased—"the level of concentration for manufacturing as a whole was appreciably lower in 1948 than in 1929 or 1922" (p. 100). Yet, absolute size has increased greatly. Comparing the first and last nine years (both including war years) of the 1917–48 year-by-year table (p. 120) employees per establishment increased from a range of 21–28 to one of 30–45, and horse-power per establishment from a range of 76–137 to one of 207–244. This apparent paradox was largely due to the phenomenal growth of the Canadian market (p. 105) and Canadian industries, making Canada now (p. 3) as industrialised, considering its total population, as the United States. As Rosenbluth confirms (p. 16), concentration is usually higher when industries are smaller. In the United

States (compared with Canada in Chapter IV) corresponding industries were larger, though size of plants and firms were much the same, hence concentration has remained greater in Canada.

The Canadian Census of 1948 was particularly generous in its detail about firms, though it must be borne in mind that by the size of firm is only meant its size within a given industry—integrated firms appear as different firms, one in each industry. The author has been correspondingly generous in publishing summary measures based on this detail. He provides appendices in which the seventy to ninety industries selected (p. 15) for their homogeneity which he deals with, have various indices worked out of their concentration; their average number of plants per firm; their average size of plant and firm; and their degrees of mechanisation or "capital–labour ratios," such as horse-power or fixed assets per worker. These measures make it possible to attempt correlation, for instance, of the mechanisation of an industry with the average size of its plants or firms. But there is the danger that slick mathematical averaging may cover up some essential facts. Many industries, to judge from British and American experience, have no really typical size of plant and some indeed, a bimodal distribution of sizes. An arithmetic mean size can always be mechanically churned out by dividing number of employees by number of plants, but the resultant quotient will not always be a representative size of plant. Though he stresses the importance of the average size of plant and of firm, and happily keeps the two separate, the author unfortunately does not give us the basic distribution of sizes from which to judge. Again, the significance of the bare horse-power per worker ratio as an index of an industry's mechanisation, depends on whether much power has to be used in heavy processing or whether the power is only activating light, but often expensive, high-capacity and specialised machines in such work as assembling parts. The author, though aware (pp. 43, 51) of these qualifications, makes no distinction and finds (p. 56) only a low positive correlation between horse-power per worker and size of plant in industries generally. The coefficient will be found much higher if (as the admirable appendices allow) the degree of mechanisation is correlated with size by comparing the horse-power index of industries using power only in a similar way, for instance, in assembly. Really high correlation cannot be expected, since many other factors, particularly the locations imposed by transport cost on certain industries, cut across the effect of mechanisation on size. Rosenbluth does not deal in detail with location except for a listing of fifteen industries (p. 44) "having high transport costs . . . to provide a rough test of the influence of transportation barriers on firm size and concentration."

Concentration in industry rather than firm size is the main theme of this book, and the author should not, perhaps, be held responsible for any deep inquiry into the causes of the variation in the average size of firms in different industries, which he leaves (p. 17) as a field for a "promising attack." He

has certainly advanced realistic economics many steps farther in co-ordinating and perfecting the measurement of concentration, in applying statistical analysis to these measures and in demonstrating the importance of such factors as industry size and the capital–labour ratio when accounting for concentration.

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The Dock Worker. (Liverpool: Liverpool University Press. Second Impression 1956. Pp. 277. 17*s.* 6*d.*)

This book was first published in 1954 and is a study of industrial relations in the Port of Manchester. It is the work of a team of investigators from the Liverpool University Department of Social Science, and reflects conditions in the port during 1950–51. We are told that Manchester was chosen in order to gain experience for later systematic study of the more complex case of Merseyside.

The result is a very worth-while book of much wider significance than we are led to expect. Although the differences between Manchester and other ports need always to be borne in mind, the reader feels that he is being given a valid understanding of the reasons why labour troubles persist in dockland in spite of considerable improvements in working conditions and full employment.

The book necessarily centres around the working of the National Dock Labour Scheme. Its central thesis seems to be that this has given dock workers economic security (in the form of a guaranteed minimum wage) but not social security. The latter is a difficult concept, and seems to stand for those psychological satisfactions which work must yield if the worker is to be contented and efficient. One important aspect of it is regularity of employment. Men are still not assigned to work systematically but by the haphazard and somewhat degrading procedures of the call-stand.

The present reviewer was not entirely satisfied with the evidence on this. About 40% of the men appeared to like the system, and might easily cause trouble if it were changed. Nor does it appear that irregularity of work occurs to the extent suggested. A table presented elsewhere in the book (p. 167) shows that in 1951 only 11% of the sample of dock workers interviewed worked on an average less than 44 hours per week, and only 9% more than 52 hours. Since these figures are affected by sickness, holidays and voluntary absence, it would appear that the very great majority of the men had the chance to work (on an average) a standard week throughout the year. There is no evidence to show undue variation of hours in individual cases from week to week, though in view of the nature of the work and the wages structure this would not be surprising.

The majority of the dockers were extremely critical of their union

(T. & G.W.), and took little active interest in it. Criticism centred around its size, heterogeneity, bureaucracy and detachment from life in the docks. This needs to be related to a comment on the 1951 strike (a comment critical of both management and union), where the authors deplore the "retreat from the common concerns of human relations into an unreal world of red tape and special pleading" (p. 209). One has the feeling that one is nearer to the heart of the matter here than in the discussion of the shortcomings of the National Dock Labour Scheme.

There is much more in this book of interest to economists than can be indicated in a short review. There is, for example, an excellent factual account of the Dock Labour Scheme and the organisation of dock work at Manchester. Of more general interest is the account of the wages structure, which seems to give considerable scope for disputes without the virtue of relating reward very closely to skill and effort. Nevertheless, it appears elsewhere in the narrative that efficient and reliable workmen may reap their reward in other ways. Those engaged in current wrangles about wages in theory and wages in practice will find much food for thought here.

Occasionally the authors get carried away by their obvious enthusiasm for the job. One wonders how much significance is to be attached to the effect of recent changes on the patriarchal structure of dockland society. Also it is only too easy to get lost in the maze of facts. Thus, for example, the statement that 95% of those thinking that the Ship Canal Company was a bad employer were sons of dock workers needs to be related to the fact that 75% of those interviewed were sons of dock workers.

All in all, this is a valuable and well-presented piece of research. It is to be hoped that it will be widely studied, not only by professional economists and sociologists but also by those who appear in its pages.

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The British Tinplate Industry: a History. By W. E. MINCHINTON. (London: Oxford University Press, 1957. Pp. xvi + 286. 35*s*.)

USING first iron and later steel as its principal raw material, tinplate manufacture was for two centuries a separate, small industry. Founded on the natural advantages of abundant water supply and comparatively easy access to raw material as well as to exporting docks, it soon became predominantly localised in numerous small family businesses in South Wales—a situation maintained, even when circumstances changed, by the availability of skilled labour. As late as the 1930s, it was importing from abroad a substantial proportion of its steel bar. Yet by 1959 it will have ceased almost entirely to be a separate industry and will have become only one of a number of end-products of two or three giant plants which integrate all

the processes of iron and steel manufacture. It is most appropriate that Mr. Minchinton, working in University College, Swansea, should have been able to record at this time the whole of these two centuries of development.

The industry began its expansion behind the shelter of tariffs, imposed in 1703 and 1704, which kept out imports from Germany. Subsequent developments in the rolling of plates soon gave it a virtual monopoly of world trade, until the McKinley tariff of 1890 dealt it so severe a blow that for a time it seemed unlikely to recover. But this, though the most noteworthy, was only one of the periods of depression which it had to endure up to the time of the Second World War. It is a melancholy, though fascinating, story of alternating expansion and contraction, of over-production followed by redundancy, of fierce competition succeeded by cartelisation and other forms of restriction. Systematic research and the development of new processes seem to have been almost non-existent until at long last mergers and amalgamation produced really large units of production. The story does not confirm the belief held in some quarters that competition is the best guarantee of efficiency.

Mr. Minchinton, however, permits himself no generalisations about economic policy. The facts must speak for themselves, and reader can draw his own conclusions. But the facts are all here; they are presented with clarity, with precision, without jargon and without waste of words. The author has devoted years of study to a mass of material (there are six closely printed pages of bibliography) which he has completely mastered. This is now without question the most authoritative book on the tinplate industry in Britain. I hope that Mr. Minchinton himself and other economic historians in the University of Wales will now go on to make similar studies of other local industries—tramp shipping, for example, might justify a claim for exploration before all records are lost.

A sentence or two about Henry Folland, Sir William Firth, John Hodge, Ben Tillett and Ernest Bevin make one wish occasionally that Mr. Minchinton had devoted more space to the personal drama of this industry, its internal competition, its mergers and so on; but perhaps that might have marred the strict objectivity which he has so admirably maintained throughout. One feels confident that he has never selected a fact for record because it would help to prove a case, nor omitted anything of significance because it would not fit the pattern. The only omission that can seriously be regretted is that there is no treatment at any length of the profitability of the industry. Having said that, however, let me repeat that this is an admirable work, which should be read not only by all economic historians, but by all persons who have responsibility for our steel industry.

H. A. MARQUAND

London.

The Economics of Soviet Steel. By M. GARDNER CLARK. (Cambridge, Mass.: Harvard University Press (London: Oxford University Press), 1956. Pp. 400. 60*s.*)

THIS is the latest volume to come from the Russian Research Center of Harvard University. The first titles have dealt more with politics than economics, and this is the first study of a single Soviet industry to be published. It is doubly welcome, as breaking away from the aggregative approach to the Soviet economy and as a detailed, painstaking study of " the central, most vital sector of any modern industrial economy."

The first part describes the remarkable growth of production and investment in the Soviet iron and steel industry. An interesting chapter on the relationship between costs and prices and the system of subsidies leads into a discussion of the rate of investment (for which, in Soviet terms, only " wreckers " would insist on the criterion of profitability). Part 2 discusses problems of specialisation and scale. In techniques the Russians decided to " follow the American way " and hence to build bigger and bigger units. There is a good discussion of the difficulties this " gigantomania " led them into, especially the physical strain on, and high cost of, the transport system and the neglect of the consumers' needs. Perhaps fortunately, a surprisingly large proportion of steel-making and rolling remains outside the jurisdiction of the Ministry of Iron and Steel in the small-scale plants of machinery builders. This gives some flexibility.

Part 3 is concerned with the factors affecting location of the industry and its future development, and Part 4 reviews the productivity record. The Russians' main concern here is not productivity of labour, of which they have in the past had a plentiful supply, but productivity of capital equipment. Mr. Clark makes the judgment that while labour productivity is quite low by American standards, the productivity of furnaces measured by some coefficient of " the utilization of useful capacity," is higher than in the United States.

The growing shortage of high-grade ore and good coking coal in the U.S.S.R. is imposing the same sort of problems on the Soviet industry as much of the British industry has had to face for some years. The discussion of techniques, scattered throughout the book, is one of its most valuable features. There has been no sign so far of the Russians innovating, but they are very quick to adopt any advance in Western technique. The British steelmen who went on the tour of the Russian industry in the autumn of 1955 reported that their best was equal to our best. It is doubtless the scarcity of capital which has led them to concentrate apparently so much on the technical efficiency of existing equipment. Where we might use benefication of ores *or* high-top-pressure operation, the Russians may well use both; they have been quick to introduce the use of oxygen in the air blast, and so on. On the other hand, it may be misleading to speak, as

Mr. Clark does, of the "conversion of blast- and open-hearth furnaces to automatically controlled operation." While the Russians may use any "instrument one could think of," there is other evidence that they are no closer to the technical ideal of a fully automatic furnace than we are. One would have liked a more systematic discussion of Russian technology than is perhaps possible from the material.

The Soviet industry has so far always been under pressure to produce more. Now there is not only the home demand of an industrialising nation but there are also the satellite countries to be considered, China, and perhaps those countries in a wider orbit who may be influenced by trade. We may perhaps draw some political comfort from the conclusion suggested by Mr. Clark, that the Russians might welcome the opportunity to cut their armaments industry, with its drain on quality steel.

This book should remain a valuable source book for many years. The facts which it contains have been found "scattered here and there through the pages of innumerable Soviet economic and technical publications," and every fact is most carefully documented. There is much here for the student of Soviet statistics. For the student of industry there is again much detail. An appendix lists all the Soviet iron and steel plants with their main characteristics. Nevertheless, the places where it reads more like a thesis than a book are relatively few, and it would give a wrong impression of Mr. Clark's style to quote such instances. Inevitably it is a study written from the outside, and therefore there is lacking the information one would like on the decision-making processes—what decisions are taken at what level, and how the questions, for example, of prices and costs are really settled. Nothing is said on research into technology. How is it decided what technical lines to go for, and what is the role of the central research institutions? Within these limitations, however, Mr. Clark has produced a good and useful book.

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The Obligation to Carry. By A. M. MILNE and AUSTEN LAING. (London: Institute of Transport, 1956. Pp. 129. 5*s*.)

THIS monograph deals, in the main, with the question of how far "obligations" (law and custom, imposed from outside or arising within the organisation) may be expected to hinder British Railways in their competition with other forms of transport, and with road transport in particular. The problems arising from the fact that the railways regard themselves, and are regarded by the community at large, as a "Public Service" form the core of the book. Here the case for changing the concept of "Public Service" from that adopted by the British Transport Commission before the Transport Act, 1953, is presented.

This was, briefly, to carry the good with the bad traffic and to supply all demands within a structure of prices imposed by the Transport Tribunal. It should be altered, it is argued, to one where traffic is carried only at a price constructed from a basic element of costs specific to the traffic in question, to which is added a contribution to other costs, based on relative demand elasticities, and subject to a limitation on total profits. The supporting arguments (chiefly about the allocation of resources) will in general be familiar to economists, and they possibly do point in the correct *direction* for change in the rates structure. Whether they will enlighten the railways themselves is another matter.

A good deal of the railways' thinking about " Public Service " is coloured by the allegedly large incidence of common and joint costs. The railway administrator may know the direction of change but still see no clear principle of allocation and discrimination to help him fix actual rates. The authors cannot deal with the " practical difficulties " of costing, but outline the " doctrine of avoidable costs " and put the need for discrimination. The administrator might well feel impatient with such reassurances about the avoidable cost approach as: " if the spatial and temporal references are made explicit, then there exists the basis for determining the specific costs involved in the decision (on rates) " (p. 96). Making them explicit—that is, guessing the interrelations of demand and cost—remains a really formidable job.

The railway administrator does not need telling about costs so much as freeing from his fears on the demand side, fears which will not be dispelled by the author's scrupulous avoidance of the command " maximise your profits " in favour of the command " avoid an undue profit " (p. 63). (One would have thought indeed that compromising here would be as fatal to the proper allocation of resources as ignorance about costs.) The railways still seem to be convinced of the need to modify " unfair competition " from the roads. The arguments (pp. 82 ff.) in support of restriction of entry into road haulage will presumably be welcome there. But the reasons given for this are highly debatable—that there exists a procession of road hauliers who, ignoring their long-run costs, are forced in turn to withdraw from the battle, being replaced by new-comers who ignore this experience. The idea of carnage among road hauliers has never been proved to be true even for the 1920s and 1930s, and must be quite wrong nowadays. If entry *is* so restricted, one can imagine road hauliers entering with glee those " further arrangements, voluntary or otherwise, between road and rail to ensure that all transport operators are pursuing a common policy of economic pricing and that price data are made available to all concerned " (p. 85). (These are deemed to be necessary to set the stage for competition between road and rail.)

On the most interesting and vital question of how the large-scale organisation, personnel and the prominence of the railways will affect their

competitive behaviour, there is disappointingly little. A few general paragraphs point out the disadvantages of the "unflexibility" inevitable in railway administration, the impossibility of making calculations of profit at a low level in the organisation and the direct commercial disadvantage of having to publish information when competitors do not have to do so. The last of these points may be accepted, but as to the others, one can, of course, think up other arguments to show the advantages of large-scale organisation—the quality of information gathered, market forecasting, the hiring of more costly personnel, etc. The question here is really which of these possible merits and demerits actually apply in the railways, and, more important, how decision-taking at different levels could include the use of much more complex techniques of costing.

On the whole, it is difficult to see to what body of readers most of this monograph will appeal. Its limited field restricts its interest for the professional economist. Administrators in the transport industry who are concerned with the theory of costs will wish to know much more than is given here. And it will make little impact on the arguments of organised railway users bent on maintaining privilege before the Transport Tribunal. However, the first two groups will benefit from the historical survey of obligations which precede the main arguments, and even the last may be a little shamed by a witty chapter on "The Public Attitudes towards the Duties of the Railways."

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The Organisation of Science in England. By D. S. L. CARDWELL. (London: Heinemann, 1957. Pp. ix + 204. 18*s*.)

ECONOMIC history is rapidly being conventionalised as a series of "revolutions," each providing the essential conditions to generate its successor, each arising out of the conditions established by its predecessor. This book is concerned with the origins of a recent member of the series, the applied science revolution, which Dr. Cardwell describes in his preface as the "second industrial revolution." In particular, it lays much of the blame for Britain's backwardness in this second industrial revolution on the failure of the educational system to provide an adequate body of professional scientists.

What was lacking, according to Dr. Cardwell, was a scientific rank and file, the corps of trained second-class men who should have been available to put new materials and processes through the research and experimentation stages which must precede practical industrial application. The classic illustration of this deficiency is the case of the aniline-dye industry. Although the initial discovery was made by an Englishman and although the basic raw material (coal) was abundant in England, it was the Germans who developed and improved the new process and took the industrial lead.

Not until the state-aided science schools, inspected by officers of the Royal Engineers, penetrated the " Iron Curtain of Latin and Greek, buttressed by class privilege and underpinned by the Established Church " did science become a recognised profession. The demand for science teachers created a class of professional scientists from which industry could eventually recruit what it needed. It was a slow process, however. At the beginning of the twentieth century there were only a few hundred professional chemistry graduates in England, and of these about three-quarters were teachers.

This description of the development of science education in England, and of the process which transformed the typical scientist from the distinguished amateur of the nineteenth century to the professional specialist of the twentieth century, makes fascinating reading. Dr. Cardwell has established convincingly that there was a relative scarcity of applied scientists in nineteenth-century England (relative as compared to other industrial countries) and that the educational system was largely to blame for this deficiency. By implication, English manufacturers suffered under a heavy handicap in a world where opportunities for technological progress were largely found in the application of science to industry.

How important the handicap was, in practice, in retarding British economic growth it is difficult to say, however, within the rather limited focus of this book. To put it in its proper perspective we need to know more about the relation between science and industry than the number of applied scientists. Nor indeed is Dr. Cardwell's hypothesis of the passivity of industrial demand acceptable on *a priori* grounds. If the Army could create its own cadre of applied scientists in spite of the deficiencies of the educational system, then so, surely, could industry. If industrial demand did not exist or was ineffective in spite of the industrial opportunities offered by the application of science, then this is a circumstance which requires explanation.

Within its limits this is a useful and suggestive contribution to the history of British industrial progress. Its emphasis on the role of the educational system and on the influence which government was able to exert through that system is well justified.

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The Highland Economy, 1750–1850. By MALCOLM GRAY. (Edinburgh and London: Oliver & Boyd, 1957. Pp. viii + 280. 25*s*.)

To students of British economic development the story of the Scottish Highlands has an interest which is disproportionate to their weight in the national economy. For this is the region which the Industrial Revolution passed by. It is Britain's most intractable underdeveloped area.

This study traces the origins of the Highland problem to the crucial century during which the first Industrial Revolution transformed the British economy. For much of the period there was little, on the face of it, to distinguish the rate of advance in the Highlands from that of other agricultural areas in Britain. The region shared in the phase of rapid population growth which began in the second half of the eighteenth century and continued in the early decades of the nineteenth. It built up new industries (kelp and sheep-farming) and developed old stand-bys (cattle and fish) in response to the new demand by the industrialising south. There was a notable expansion in the area's social capital as measured by the expenditure on roads and canals.

For the true Highland counties, the crofting counties, it was essentially a passive participation involving remarkably little development in average productivity and no increase in money incomes which was not fully reversible by a change in the terms of trade for primary products. The increased population had been fed partly by expanding the area under cultivation but largely by the widespread adoption of potatoes as a staple crop. Between 1750 and 1850 there had been no appreciable improvement in grain yields or in animal husbandry or fishing techniques, no new manufactures to replace the cottage industries killed by factory competition and no reinvestment of boom earnings in projects of long-term significance. The Caledonian canal, constructed largely by immigrant labour, created no new traffic in the area which it served. There arose no indigenous class of merchant entrepreneurs willing to speculate their capital in the new economic opportunities of industrialisation.

Hence the prolonged decline in primary product prices which followed the Napoleonic wars and the disastrous series of potato-crop failures in mid-century bore upon a community which had developed no reserves and no alternatives. By the middle of the nineteenth century it appears that the average Highlander had a lower money income, a smaller animal stock, a narrower range of cottage industries and a less varied diet than his predecessors half a century or more ago. The only solution was emigration.

It should be admitted that the author's conclusions are not quite as unequivocal as this, partly because he is concerned also with the eastern Highlands, where there had been less resistance to change and more assimilation of Lowland agricultural techniques. Partly also it is because he is conscious of certain immaterial values in the Highland way of life—" a fine essence of living that was lost in the more prosperous east." It would have been interesting to have had this " essence " defined more precisely. On balance, however, he concludes that material conditions deteriorated in the north-west during the century under review.

Dr. Gray has explored a variety of sources in a thoroughly convincing way, and he writes with style though not always with precision. This is the kind of regional research which can be recommended to a national and

even to an international audience. But the non-specialist will find it difficult at times to distinguish the wood from the trees. Nowhere, for example, are we told in absolute terms how many people lived in the region, nor how they were distributed, nor how their numbers changed in the course of the century. If we try to work it out for ourselves by reference to readily accessible sources we find that it is far from clear exactly which Scottish counties, or definable parts of counties, fall wholly within the Highland Economy as visualised by the author. Most economists will be grateful for the numerous statistical illustrations drawn from local records, while regretting the lack of a broader statistical background to give them perspective. A good map—though not essential to the narrative—is another accessory that might assist the mere Sassenach to feel at home with the geographical detail.

These, however, are surface blemishes which do not detract from the scholarly quality of this book nor from its value as a contribution to the growing number of regional histories of the Industrial Revolution.

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European Refugees, 1939–52. A Study in Forced Population Movement. By M. J. PROUDFOOT. (London: Faber & Faber, 1957. Pp. 542. 52*s.* 6*d.*)

THIS book, the product of six years of research by the late Professor Proudfoot, fills a surprisingly large gap in the history of the forced population movements of the Second World War and the subsequent activities of the international agencies that were set up to take care of the millions who had to be repatriated or resettled. The author has attempted to encompass in one volume the period from 1939 to 1952 covering three phases of the refugee problem of the Second World War: the forced population transfers undertaken by Nazi Germany and the Soviet Union, the organisation of mass repatriation and rehabilitation schemes by the allied military authorities and the United Nations Relief and Rehabilitation Administration (U.N.R.R.A.) and the resettlement work of the International Refugee Organisation (I.R.O.). Much of this story is already known to specialists from the work of Eugene Kulischer, Joseph Schechtman, Jacques Vernant, H. B. M. Murphy and Gerald Reitlinger—to name only a few. There are also official histories of U.N.R.R.A. (by George Woodbridge) and I.R.O. (by Louise W. Holborn). But this is the first study of its kind which traces the history of these momentous years in the lives of some 60 million Europeans who were uprooted by the War and its aftermath.

While suffering from an *embarras de richesse* in so far as material on re-

patriation and resettlement of the refugees was concerned, the author had to rely on a variety of less satisfactory sources in his analysis of the first and, to a refugee reviewer, perhaps the most fascinating phase of the story. This is the story of war-time movements, which starts with an account of population transfers in German-occupied Czechoslovakia and Poland and includes chapters on escapes from the occupied areas (Chapter III) and forced-labour movements in Germany (Chapter IV). To reconstruct this phase of the European refugee story is an immensely difficult task. Although much useful evidence was collected during the Nuereмberg Trials, no study has yet been made of the Nazi archives relating to the population transfers. The highly centralised machinery of the department headed by Fritz Sauckel, Hitler's Commissioner General for Man-power, and the operations of *Organisation Todt*, the two principal institutions responsible for procurement of slave labour, require a study in its own right. But relying on some fragmentary material brought together by the Anglo-American Committee of Inquiry of 1946 and the International Labour Office study of *Exploitation of Foreign Labour by Germany* (1945) and various newspaper sources, the author has brought together massive evidence which is of interest to a political scientist, student of economic planning, historian and demographer alike.

To extract some meaning from the chaotic war-time population movements, the author devotes special attention to an examination of types of migration rather than the counting of persons. Most of the migrations stemmed either from Nazi policies, Soviet policies or the general disorganisation of war. Following this line of approach, we note the transfer and resettlement of some 821,000 ethnic Germans in accordance with the Nazi plan for colonisation of the Incorporated Provinces of Poland; the tragic case of some 9 million European Jews, of whom 5 million were exterminated by the Nazis and some 800,000 deported in the Soviet Union; the movement of forced-labour populations to meet the man-power requirements of Germany (8½ millions) and the U.S.S.R. (2½ millions); and the other migrations due to the general military situation. More often than not one type of migration movement dissolved into another, German colonists became refugees overnight as the Red Army moved westward. Not all Jews from the German-occupied territories were deported to Poland; some were put to work in slave-labour brigades and managed to survive, and a small number were able to emigrate to Palestine. Some individuals underwent double deportation, first at the hands of the Germans, then at the hands of the Russians. Thus migration in war-time Europe was a process of continuous flux in which millions of persons were being moved from place to place without any regard to their personal wishes or comfort.

The story of the German concentration camps is told in Chapter X. To-day it is convenient for the free world to forget, as best it can, this

strange and terrible story. There are known to have been in all some 500 concentration camps and satellite work camps in operation in the later stages of the War. The camps were of various sizes and types, ranging from forced-labour camps housing a few thousand prisoners to huge " death factories " like Auschwitz–Birkenau in Poland and Dachau in Bavaria, in each of which some 50,000 men and women were awaiting their turn for asphyxiation in a gas chamber. The total number of people involved in this fantastic nightmare cannot be estimated with any degree of accuracy from the captured German archives. A conservative estimate puts the number of persons who were sent to the camps at 6⅔ millions. Six millions of these were exterminated. " This is the record "—says Sir John Hope Simpson in his Preface—" of a crime unique in history in its magnitude and incredible cruelty."

The bulk of the book is concerned with what can be called the three R's of the post-war refugee story—repatriation, rehabilitation, resettlement. As I have already stated, much of this work is known from official accounts and scholarly works. Furthermore, the operations of U.N.R.R.A., I.R.O. and the Office of the High Commissioner for Refugees and scores of voluntary relief agencies have been conducted under the full glare of world-wide publicity. What the author has done, however, has been to unite a coherent account and critique of the work of these international bodies, and this in itself is by no means a small contribution. As a senior member of the Displaced Persons Branch of the Supreme Headquarters Allied Expeditionary Force (S.H.A.E.F.), he was responsible for the drafting of the S.H.A.E.F. plan for the control, care, repatriation and resettlement of refugees. With the termination of S.H.A.E.F. the plan became a blueprint for the work of U.N.R.R.A. Subsequently, many of its basic principles were retained in the constitution of I.R.O., which assumed responsibility for the maintenance and resettlement of just over 1 million refugees after July 1947.

The emphasis in the part of the book dealing with the three R's of the post-war refugee story is on lessons which can be derived from the study for the future. As the relatively recent experience of Korea and Indo-China has shown, the refugee problems created by war cannot be entirely solved during the military period. It is, therefore, essential that the planners, both military and civilian, should make a detailed study of the practical problems involved in the handling of the refugees during and after the Second World War. The work under review can be recommended as the best text-book for a study of this kind. Students of refugee problems are indebted to the colossal labour and outstanding achievement of one man.

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The War Potential of Nations. By K. KNORR. (Princeton, New Jersey: Princeton University Press, 1956 (London: Oxford University Press, 1957). Pp. 310. 40*s*.)

THIS is an unsatisfactory book. Its object is " to contribute to a theory of war potential," by which is meant, as must be meant with such a subject, some way of arranging our knowledge so that it will be a reliable guide for future policy and in future eventualities. But it repudiates the aim of establishing a *general* theory of war potential because, as the author recognises, a theory that tried to accommodate all the possible types of war situation that might occur in the future would consist of rather sterile generalities. For this reason it limits itself to discussing methods of estimating war potential in relation to further wars of attrition between Great Powers on the model of the first and second World Wars. At this point it runs into another difficulty, the uncertainty whether there will ever be such a war again in view of the emergence of nuclear weapons. On this Professor Knorr concludes that, since we do not know the answer and had better be on the safe side, we ought to assume that such wars are still possible and that war potential, as opposed to immediate and mobilised strength, may therefore still prove to be relevant in the future as it has been in the past. But nothing he says makes the uncertainties any less. And after thus lowering his sights the author still fails to rise above rather obvious generalities in his attempt to provide a limited theory.

He begins the attempt by accepting another limitation. Previous definitions of what constitutes war potential have failed to be precise; he therefore deliberately disregards some elements of potential strength in order to achieve precision in discussing the elements that seem to matter most. He considers those to be morale—what he calls " motivation for war "—and administrative efficiency as well as economic strength. But even if it is agreed that these are the fundamentally important criteria, Professor Knorr's detailed analysis of each of them gets us no nearer to a theory. Nothing that he says about morale leads one to believe that it can be accurately measured in advance for contingencies that have not yet arisen. Relative administrative superiority comes to mean in the end superiority in improvisation, wisdom and judgment. Who can measure these, and what theory can help us to acquire them? The sections on economic elements in war potential are full of precise information of great interest, drawn from the findings on the last World War, but it is impossible to see anything novel in the conclusions they give rise to. Here are some of them. "The composition of a nation's productive resources is highly relevant to its wartime strength." " Other things being equal, a nation's economic war potential will be greater, therefore, the more the durable goods and chemical industries contribute to the national product in peace-time." "For wars other than nuclear *débâcles*, capacity for manufacturing

production is now the most important factor in the economic basis of war potential."

The truth seems to be that our knowledge of the world's Great Powers from these points of view cannot be precise enough for what the author calls predictive purposes; or that, if it can be precise, it does not take us much further than common sense will take us anyway. We know who are the World's Great Powers from the potentiality point of view without needing a theory which explains why they are. We do not need a theory to enable us to predict that a Great Power could beat a little one—other things being equal. Anything worthy the name of theory must be able to forecast which of the Great Powers could beat which others of the Great Powers in various circumstances. And even if we could evolve such a theory, and even if every sociologist swore by it, no Great Power would believe it until it had been tested.

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NOTES AND MEMORANDA

A NOTE ON TINBERGEN ON THE OPTIMUM RATE ON SAVING

In his paper on "The Optimum Rate of Saving" in the Economic Journal, December 1956, Professor Tinbergen has shown how an optimum rate of saving for the society can be arrived at, given a welfare (utility) function involving present and future consumption and a technical function showing how much future consumption can be created by sacrificing a unit of present consumption. Professor Tinbergen's approach is based on a set of assumptions about measurability, addibility and interpersonal comparability of utility as well as the identity of utility with welfare, which are not difficult to criticise. In this note, however, we shall grant these assumptions and shall try to see whether, given all these, Professor Tinbergen's approach is acceptable.

First, can one relate utility to total income without looking at the income *per capita*? Professor Tinbergen uses two utility functions both leading to diminishing marginal utility with increasing income irrespective of the growth of population. But surely there is no *a priori* reason for expecting diminishing marginal utility if population is growing at the rate at which income is rising. In any case, that one cannot have a unique relationship between income and utility seems obvious—the utility function will be affected by the number of people enjoying that income. If the growth of population is affected by the level of real consumption, and thus by the rate of saving, the problem has to be tackled in terms of a set of simultaneous equations. Even if population growth is assumed to be independent of our decision, the choice will be affected by the fact that utility depends, among other things, upon income *per capita*.[1]

Secondly, can we assume that the capital–output ratio is independent of the saving rate? The rate of saving gives us the increase of the capital stock. But, given the technique, unless we increase the labour supply at that rate, the rate of increase of output will be lower. If the labour supply is increasing at a lower rate than the capital stock the gap has to be made up by a rise of the productivity of labour (with constant capital–output ratio), *i.e.*, by a growth of technological knowledge. But can we assume that as soon as we try to speed up the full capacity rate of growth of output by choosing a higher rate of saving, progress of technological knowledge will

[1] We are assuming here equal distribution of income. If distribution is unequal, one has to compare degrees of inequality. Actually the distribution of income may not be independent of our decision about the saving rate. In a free-enterprise economy one method of raising the saving rate is to transfer income from those who save little to those who have lower propensities to consume which may involve an increase in the degree of inequality of income distribution. This will make the problem even more complicated.

also be speeded up to the required extent? [1] When such adjustment does not take place, a higher rate of capital accumulation will require some replacement of labour by capital, *i.e.*, *a movement along* the production function, thus raising the capital–output ratio.[2] This dependence of the capital coefficient (K) on the rate of saving ($1 - c$) is of considerable significance as far as the choice of the rate of saving is concerned, since the gains from a higher rate of saving will thus be less than Tinbergen's equations suggest.

Thirdly, is it correct to say that "there need not be, in principle, any difference between the choice an individual makes and the choice to be made for the nation as a whole"? [3] Surely the "psychological discount" of future income arising from the so-called defective telescopic psychology is not very relevant from the point of view of planning.[4] We are interested in to-morrow's satisfaction as such, not in *to-day's assessment* of to-morrow's satisfaction. The "psychological discount rate" ($n - 1$), which Tinbergen uses in this connection,[5] appears to be not quite applicable in planning problems.

Again discounting of future may not be entirely "irrational" as far as the individual is concerned, for he is mortal. The more distant the future, the less is his chance of being alive. And he is less interested in his heir's satisfaction than in his own. Thus future income may indeed mean less to him, and some sort of time discount is very understandable. Actually from an individual's point of view integrating a utility series from to-day to infinity, as Tinbergen does, does not seem to be very meaningful. This may *partly* explain why Tinbergen found that the observed personal rates of saving in most countries were so much lower than the values he expected on the basis of his equations (*op. cit.*, pp. 607–9). Part of the explanation may also lie in the simple fact that while from the point of view of the individual the return to capital is the interest rate, from the point of view of the society it is the net output produced per unit of capital. Even if the

[1] In Mr. Harrod's terminology, the "natural" rate of growth must become equal to the "warranted" rate of growth, whatever the value of the latter.

[2] Professor Tinbergen recognises the importance of technological advance in determining the value of K. "The values to be given to the *capital coefficient* K, we saw, have to depend on whether we assumed that, together with increased savings, there will be forthcoming the increased technological knowledge, organisation, etc., that, in the history of developed countries, accompanied the growth of their capital assets. In other words, whether together with savings the growth of knowledge and organisation can also be accelerated. If this is assumed to be the case, we should give to K the values of about 3 or even a little less; if not, K may be considerably higher, up to 20" (*op. cit.*, p. 608).

The point, however, is not so much that the value of K may vary, but that an attempt to cut down c may raise the value of K.

[3] *Op. cit.*, p. 603.

[4] F. P. Ramsay dismissed the idea of pure time discount as "ethically indefensible" as it "arises merely from the weakness of imagination" ("A Mathematical Theory of Saving," ECONOMIC JOURNAL, December 1928, p. 543). See also "A Note on the Discussion of the Problem of Choice between Alternative Investment Projects," *Soviet Studies*, January 1951, pp. 289–90.

[5] *Op. cit.*, p. 605.

interest rate is equal to the rate of profit on capital invested, it does not include the share of other factors of production in the income created by the investment.

When we integrate the utility flows in Tinbergen's case I up to T years, we get [1]

$$U_a = \log (c \,.\, Y_0) \left(\frac{1 - n^{-T}}{\log n}\right) - \frac{(1 - c)T \,.\, n^{-T}}{K \,.\, \log n} - \frac{(1 - c)}{K} \left(\frac{1 - n^{-T}}{\log^2 n}\right)$$

Maximising this with respect to c, we get the optimum value of c,

$$c = \frac{(1 - n^{-T})K \,.\, \log n}{1 - n^{-T} - T \,.\, n^{-T} \log n}$$

In the limiting case of Professor Tinbergen, where $T = \infty$, this reduces to $c = K \,.\, \log n$. Thus, for example, when Professor Tinbergen assumes $K = 3$ and $\log n = 0{\cdot}05$, the "optimum" rate of consumption is 0·15 (*i.e.*, the rate of saving is 0·85). It is these high values of the "optimum" saving ratio which make Professor Tinbergen conclude that "in order to explain observed personal rates of saving prevailing in most countries we must assume that either the capital coefficient is supposed to be much higher than the values usually now presented or the psychological discount rate is considerably higher than normal interest rates." [2]

If, however, we introduce the difference between capital–output ratio and the capital–interest ratio as well as the life-expectation of the individual, the problem seems much easier to solve. Even if we assume as high a rate of interest as 12½%, *i.e.*, a capital–interest ratio of 8, and use it in place of the capital–output ratio of 3, we get 0·4 as the value of the consumption rate. And if the average saver expects to live only twenty years more and tries to maximise utility (psychologically discounted) for that period (*i.e.*, $T = 20$), the value of c becomes 0·9. The rate of saving 0·1 is not too far from the observed personal rates of saving.[3]

For the purpose of the choice of *social* optimum rate of saving, however, it is the capital coefficient, and not the capital–interest ratio, which is relevant.[4] Also the expectation of life of the present savers need not determine the time horizon to be taken into account, nor is there much need to use the "psychological discount" in planning problems.[5] The

[1] I am indebted to Mr. David Epstein of Trinity College for helping me with the mathematics.

[2] *Op. cit.*, p. 609.

[3] *Op. cit.*, p. 607.

[4] We have to examine, of course, the decline of the capital coefficient with the rise in the saving rate, discussed earlier.

[5] This is not to say that in the case of the *social* choice we should not use any time discount. The *uncertainty* as to the future may be one of the reasons for using such a discount. One may also abandon pure utility analysis and make specific value judgments like "those who sacrifice should benefit." But pure time discount does not seem to go well with a model of interpersonal comparison of utility. In any case there is no reason why the individual's "psychological discount" should be taken very seriously in the determination of the optimum rate of saving.

basis of the choice for the society as a whole seems to be very different from that of an individual, for, among other things, while the individuals die the nation does not.

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THE CONVEXITY OF THE PRODUCTION POSSIBILITY FUNCTION

SOME years ago Professor Samuelson, following a line of reasoning used by Professor Bishop, demonstrated that, in the case of two products and two factors with homogeneous production functions of the first order, the production possibility curve could not be concave, but must be convex from above.[1] "This proof," said Professor Samuelson, "is suggestive only, but could easily be made rigorous." Mr. J. Black has provided a rigorous proof in the ECONOMIC JOURNAL of March 1957 (he looks at the curve from below, and thus proves concavity). His route, however, is slightly roundabout,[2] and it may be worthwhile to provide a rigorous proof along the lines suggested by Professor Samuelson.

In Fig. 1 all of both factors (labour and land) can produce either *OA* of clothing or *OB* of food.

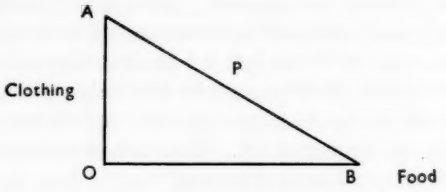

FIG. 1

It follows from the constant returns to scale property of linear homogeneous production functions that any combination represented by a point *P* on *AB* is possible. Following Samuelson's terminology, we can call *AB* a "down-the-line" production-possibility curve. Along *AB* the factor proportions used in both food and clothing are the same, and equal to the proportion of total factors available.

[1] P. A. Samuelson, "International Factor Price Equalisation Once Again," ECONOMIC JOURNAL, June 1949, pp. 184–5.

[2] Mr. Black starts by drawing a continuously concave curve to represent the locus of equilibrium combinations of two factors in the production of two goods; thence he declares the concavity of the production possibility curve. It is perhaps a matter of taste whether the continuously concave property of the former curve be regarded as intuitively obvious, or whether it also calls for formal proof.

The next thing is to show that in general there must be possible combinations above *AB*. Take any point *P* on *AB*.

Let marginal physical productivity of 1 unit of labour at *P* in clothing be c_1.
Let marginal physical productivity of 1 unit of land at *P* in clothing be c_2.
Let marginal physical productivity of 1 unit of labour at *P* in food be f_1.
Let marginal physical productivity of 1 unit of land at *P* in food be f_2.

There is no loss of generality if we assert that $\frac{c_1}{c_2} \geqslant \frac{f_1}{f_2}$.

(We can, if we wish, and as Samuelson does, tie up the direction of the inequality with which of the products is "labour-intensive" and which "land-intensive," but it is not a necessary part of the present argument.)

Suppose $\frac{c_1}{c_2} > \frac{f_1}{f_2}$

Transfer a unit of labour from food to clothing. Food output falls by f_1 and clothing rises by c_1. We restore food output by transferring land from clothing to food. How much do we need? Obviously $\frac{f_1}{f_2}$ units of land. But we could take as much as $\frac{c_1}{c_2}$ of land away from clothing to bring output back to the old level, *i.e.*, we have the original outputs and $\left(\frac{c_1}{c_2} - \frac{f_1}{f_2}\right)$ units of land to spare to be added to either food or clothing or both. Thus there are production-possibility points in the quadrant north-east of *P*.

Suppose $\frac{c_1}{c_2} = \frac{f_1}{f_2}$

In this case no transfer of factors on the above lines is any help. But in this case also the ratios of the marginal productivities of land and labour will be the same all along *AB*, *i.e.*, *AB* is the production possibility curve.

Put the other way round, if $\frac{c_1}{c_2} \neq \frac{f_1}{f_2}$ at any point *P* on *AB* it must be unequal at every point on *AB*.

What have we proved so far? Simply this: Either the ratios of the marginal productivities are the same all along *AB*, in which case *AB is* the production possibility curve and that is the end of the story. Or else the ratios are unequal, in which case there are possible points above *AB*.

It also follows that if *Q* be any point above *AB* where the ratios of the marginal productivities of land and labour in the two products are still unequal, further possible points to the north-east of *Q* can be found. We know that there cannot be points outside the area bounded by *AZ* and *ZB*. Thus there will be a production-possibility frontier running from *A* to *B*

somewhere in the triangle AZB, at all points on which the ratios of the marginal productivities of labour and land in the two products must be equal.

Let Q, R be any two points on this boundary. Suppose Q requires L_Q labour and T_Q land in food, and R requires L_R labour and T_R land in food. It follows that $(L_R - L_Q)$ labour combined with $(T_R - T_Q)$ land can produce either QM clothing *or* MR food. (Since the ratios of the marginal productivities are equal at both P and Q, both these differences must be positive.) Once more QR is a " down-the-line " possibility curve between Q and R. Once more there will, in general, be points above QR. Thus

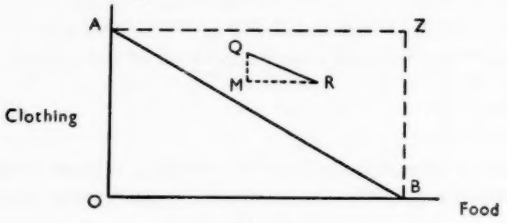

FIG. 2

the boundary joining A to B has the property that it always lies outside any chord of itself, *i.e.*, it must be convex seen from above.

This would seem to complete the proof—but there is one loose end still to be tied up. We have seen that AB itself is a special case of the production-possibility curve. Might not an otherwise convex curve have a straight bit, *e.g.*, QR? The answer is no. Since Q and R are on the boundary, the ratios of the marginal physical productivities of labour and land in the two products must be the same at Q and R, but the factor proportions employed in the two products *must* be different. Now as we travel down QR we allocated the amounts of factors $(L_R - L_Q)$, $(T_R - T_Q)$ in the same proportions to the two products. It is conceivable that $\frac{L_R - L_Q}{T_R - T_Q}$ might be equal to the factor proportions used in either of the products at Q *or* R, but it cannot be equal to both. Thus at least at one point S on QR (and in fact at every point) the ratios of the marginal productivities must become unequal, thereby allowing us to find a production possibility point to the north-east of S.

Thus the production-possibility curve is either AB itself or a continuous convex curve lying above it.

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OFFICIAL PAPERS

WEST INDIAN FINANCES

In June 1954 the Colonial Office, with, no doubt the needs of the approaching Federation in mind, asked Dr. Prest to undertake a Fiscal Survey of the British Caribbean. His report was completed by September 1955 and is now, with the addition of a short Postscript and two footnotes recording the dissent of the Government of Trinidad to criticisms, issued by the Colonial Office in its series of Colonial Research Studies.[1]

The *Survey* is arranged in three sections. It begins with a sketch of the setting (economic, administrative and social) in which the system of public finance has to operate. This vigorous and, at times, provocative introduction to the area could with advantage be read by anyone interested in West Indian affairs. Dr. Prest stresses the relative poverty of the area, the almost total lack of interest in government finance, the area's economic vulnerability and the dependent nature of the currency. These set limits to policy. Thus, the currency system limits deficit financing to the size of accumulated reserves and, as MV is more likely to be inelastic in the short run than in advanced economies, a policy of subsidisation of foodstuffs *might* not result in lower prices or a policy of higher indirect taxes bring about a higher price level. By what standards, then, should such an area's fiscal policy be judged and to what levels should public revenue and expenditure rise? Dr. Prest courageously draws the answers to these questions from his introductory sketch. The comparison should be with the United Kingdom " as it was 50 or perhaps even 100 years ago," because of the kind of problems faced and the newness of the machinery for facing them, and with a local authority rather than with the central government of the United Kingdom, because of the size of the territories and the lack of monetary autonomy. The resemblance to Latin America is held to be closer in some respects than to the United Kingdom. The answer to the second question—the right level of revenue and expenditure—is that tax revenue and expenditure should account for a smaller proportion of national income than is the case in advanced economies because of the greater need for flexibility in fiscal matters and the colossal inexperience of West Indian governments in economic intervention. Dr. Prest's argument is sound, but what is more likely to keep down the size of the public sector in fact is the difficulty of raising revenue and the need to attract oversea capital.

In the next section the accounts of each government are first analysed separately and then inter-territorial comparisons are made. Dr. Prest and his assistant, Mr. W. G. Demas, should be congratulated on the assembly of this material. The pattern is varied, but several broad conclusions emerge.

[1] *A Fiscal Survey of the British Caribbean.* By A. R. Prest. London: H.M. Stationery Office, 1957. Pp. 136 + 10 Charts. 10*s*.

Customs and excise together accounted for over one-third of consolidated current revenue in all territories, except the Virgin Islands. Income tax came next, except in Trinidad, where it came first, and in the six grant-aided islands of the Leewards and Windwards, where grants-in-aid were either the biggest or second biggest item. In the larger territories, unlike some of the smaller (notably Grenada), the yield from export taxes appears to be small, and a possible source of increased revenue seems to be uncovered. But the percentage contribution to government revenue is misleading in the larger territories, where the various statutory marketing boards levy cesses on exported produce. This reveals another feature of West Indian public finance, namely the high ratio of the revenue of government commercial bodies and public corporations, on the one hand, to current consolidated government revenue, on the other. In Jamaica the respective totals are shown as 60 million West Indian dollars and 63 million. The revenue and expenditure of these para-government bodies should be brought under regular parliamentary review: the hurried move away from *laissez-faire* should not be towards bodies not answerable to Parliament. Anyway, the search for new sources of revenue should not leave export taxes unexplored. Such taxes would, of course, amount to taxes on the profits of producers, estate and peasant.

In the third section of his report Dr. Prest examines in turn six important features of the fiscal system. Company taxation is shown to account for between 55 and 85% of total income tax collected in the larger territories and nearly as much in the smaller islands with the exception of Montserrat. The Jamaican figure will rise sharply when the 1957 agreement with the bauxite companies becomes fully operative. Some of the shortcomings pointed out in the industrial incentive legislation have been taken into account since Dr. Prest completed his report.

In his discussion of personal income tax Dr. Prest questions whether policies of social welfare can be soundly based when less than 4% of the population pay direct taxes. Tax rates are now little, if anything, below the corresponding levels in Britain, particularly when the absence in the larger territories other than British Honduras of any earned income allowance is remembered. (Incidentally, in a capital-short economy there is no case for differentiating against unearned income. The *un*earned income benefits which residents of the area receive under pioneer industry legislation might with advantage be generalised.) If, on the one hand, income-tax rates cannot be raised without adversely affecting incentive and oversea recruitment and, on the other hand, social welfare services are essential ingredients in political programmes, then the income-tax net must be more widely cast. As Miss Martin and Professor Lewis have argued (*The Manchester School*, September 1956), exemption limits are set too high and family allowances are too generous in economies where average income is low: " In a country like India or Nigeria," they say, " a man earning £200

a year is extremely well off in comparison with the average income of the population, which is only about £60 a year for a person gainfully occupied. Even the £100 a year man is definitely 'middle-class' and a cut above his neighbours. The effect of present policies is to exempt practically the whole of the 'middle-class' from paying income tax, and so the yield of the tax is bound to be small." What about the costs of collecting many small sums? Opinions differ about this, but Miss Martin and Professor Lewis think it has been exaggerated. Certainly cost would be much lower if direct taxes on the 'middle-class' took the form of land taxes and poll taxes as they do in Asia and Africa. If it is not soon found possible, economically and politically, to tax directly in one way or another many of those now below the exemption limit, one comes back inevitably to Dr. Prest's query concerning welfare services, especially when the steady growth of population is brought into the picture.

Four other topics are discussed: the incidence of taxation, budgetary procedure (which includes an ingenious demonstration that errors of budgeting are mainly deliberate), public assets and liabilities and the finances of Federation. Each is informative and stimulating. On occasion comparison with other under-developed areas would have been worthwhile and this is one way in which the foundations laid by Dr. Prest should be built on. Meanwhile Financial Secretaries and others interested in government finance in the British Caribbean should be grateful to the Colonial Office for proposing and to Dr. Prest for undertaking this pioneering *Fiscal Survey*.

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The University College of the West Indies.

CURRENT TOPICS

SENIOR economists who are visiting the United Kingdom for considerable periods during the present academic year include Professor W. Fellner from the United States, Mr. K. L. Kinsman from Australia, Professor Kenjiro Ara from Japan and Mr. J. Nowicki from Poland, all of whom are at Cambridge. Professor A. C. Harberger is dividing his time between Cambridge and the London School of Economics. Others at London include Dr. M. P. Hale, Professor A. C. Land and Mr. F. Honigsbaum, all of whom, together with Professor Harberger, are holders of Fulbright grants. In addition, Dr. J. Durand and Mr. E. McCrensky, both from the United States, are visiting the London School of Economics for shorter periods. At Oxford, Professor G. F. Kennan, formerly United States Ambassador in Moscow, is Eastman Visiting Professor; also at Oxford are Professor G. M. Meier from the United States, Professor M. Morishima from Japan and Mr. K. M. Savosnik from Sweden.

Houblon-Norman Awards. The Trustees of the Houblon-Norman Fund invite applications for Fellowships or Grants in aid of Research into the working of industry and finance in Great Britain and elsewhere and the economic conditions affecting them. Fellowships, which are intended for experienced research workers, are awarded for full-time research for one year, which may be renewed for a second year. Grants are awarded for either full-time or part-time work. The amount of the awards, which will take effect from the October 1, 1958, will depend upon the circumstances of the candidate and the probable expenses of his work. Candidates must be British subjects normally resident in the United Kingdom. Forms of application, which may be obtained from the Secretary of the Fund, c/o the Bank of England, London, E.C.2, should be returned not later than March 1.

The Trustees, on the recommendation of their Advisory Committee, have made the following awards for 1957/58:

Research Grants

Mr. J. D. Bailey, Research Student, Nuffield College, Oxford. (Renewal.)	British Investment in Australasian Financial Companies, 1870–1900.
Mr. G. E. Clayton, Lecturer in Economics, University of Liverpool.	Banking in Spain and in Portugal.
Mr. A. B. Cramp, Research Student, London School of Economics.	Operation of Bank Rate, 1822–60.
Mr. R. Davis, Lecturer, University of Hull. (Renewal.)	English Shipping Industry, 1660–1702.
Mr. A. G. E. Jones, Teacher, Bristol College of Commerce.	Growth of Banking in Suffolk, 1700–1900.
Mr. R. V. Lennard, Historian. (Renewal.)	Rural England in the Middle Ages.
Miss C. A. P. Leubuscher. (Renewal.)	Shipping Facilities available to the overseas trade of Colonial Territories.
Mr. J. W. McCarty, Research Student, Cambridge University.	British Investment Overseas in Non-Ferrous Metal Mining, 1870–1914.
Miss J. E. Mitchell, Lecturer, University of Nottingham. (Renewal.)	The Balance of Payments Crisis of 1951.
Mrs. C. S. Orwin. (Renewal.)	A History of Modern British Agriculture, 1846–1913.
Dr. L. S. Pressnell, Lecturer, University College.	Money in the Eighteenth Century.
Mr. P. Robson, Lecturer, Queen's University, Belfast.	Fiscal and Financial Aspects of Post-war Capital Levies.
Professor R. S. Sayers, F.B.A., London School of Economics.	A Study of American Banking.
Mr. J. S. G. Wilson, Reader, London School of Economics.	Banking in France and the Netherlands.
Mr. G. A. Yewdall, Research Student, University of Leeds.	Population movements in certain northern towns during the early part of the nineteenth century.

VOLUME II of *The Works and Correspondence of David Ricardo*, edited by P. Sraffa with the collaboration of M. H. Dobb, has recently been reprinted. It is hoped that before the publication of this issue of the JOURNAL it will again be available for sale, either through the book trade, or in the case of Fellows at the special price of 16*s*. on application to the Secretary at the Marshall Library, Downing Street, Cambridge.

THE following have been admitted to Life Fellowship of the Society:

Faaland, J.
Liefmann-Kiel, Prof. Dr. E.
Mangasha, Y. W.
Pattabhiraman, N.
Spiegelglas, Prof. S.

THE following have been admitted to Fellowship of the Society:

Abela, M.
Airey, J. N.
Anderson, D. L.
Ayres, A. P.
Baker, A. G.
Bates, J. A.
Belshaw, D. G. R.
Bishop, K. G.
Blackwell, W.
Bock, K. W.
Bodhiratna, K. A.
Brennan, L. E.
Brennan, P. T.
Brown, E. F. A.
Brown, F.
Bryden, W. K.
Burke, E. M.
Callan, P.
Carman, P.
Carpenter, B. R.
Chaufournier, Dr. R. A.
Clark, K. E.
Collins, J.
Collis, Lieut. Col. A. A.
Culpan, J.
Dales, J. H.
Dange, B. G.
Davies, Miss N. J.
Deutsch, Prof. J.
Dixon, D. F.
Dumbell, G. E.
Einzig, R. S.
Ellis, J. S.
Fernando, H. P.
Francis, W. D.
Fraser, C. F.
Fraser, I. S. A.
Freedman, A. M.
Gellatly, Capt. L.
Grech, P.
Gupta, P. K.
Hamilton, D. P. I.
Heaven, N. B.
Heinrich, E.
Irwin, B. M.
Jones, F. P. B.
Khan, A. G.
King, H. M.
Kothandaraman, M.
Kromphardt, Prof. Dr. W.
Lai Chin Chung
Lawley, L. C.
Levine, A. L.
Llewellyn, E.
Lowther, T. R.
Mandal, Dr. G. C.
Margolis, Prof. J.
Melville, G. L.
Mohamed, C. A.
Moorhead, D. H.
Murphy, Major R. W.
Murty, P. S. K.
Nnajide, J. N.
Noah, H. J.
O, Pu-Sheung
Ojewumi, A. G.
Ola, C. S.
Oso, I. O.
Pereira, J. A.
Pilisi, Y-D.
Preston, R. L.
Qayyum, M. A.
Ramasamy, K.
Robinson, C. H.
Sancho, T. A.
Sarma, B.
Schofield, J.
Senker, P. J.
Shahani, P. K.
Sharp, G.
Sharpe, H. D.
Smith, C. T.
Stern, R. M.
Taplin, W.
Taylor, R. S.
Tedman, E. A.
Terrell, J. R. F.
Tin Sun Tong
Tomlins, W. E.
Topper, M.
Troup, G. W.
Uduhirinwa, Dr. M. N. N.
Vickers, Dr. D.
Walker, J. A.
Watkins, G. H. J.
Watling, K. L.
Webster, A. E.
Weeks, J. M.
Williams, M. I.
Williams, T. J.
Woodrow, W. R.
Wong, Chak Ming
Yankson, E. A.
Yau, R. C. K.

THE following have been admitted to Library Membership of the Society:

Athenaeum, Padova, Italy.
Atlantic Refining Co. Philadelphia.
Bank of Israel, Jerusalem.
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Bureau of Economics & Statistics, Government of Andhra Pradesh, India.
Courtaulds (Canada) Ltd., Montreal.
Deoghar College, Bihar, India.
Graduate Economics Soc., Wharton School, University of Pennsylvania.
Hatfield Technical College, Hatfield, Herts.
Hunting Technical & Exploration Services, Toronto.
Indian Council of World Affairs Library, New Delhi.
Istituto di Economia delle Fonti di Energia, Milan.
Kelley & Millman Inc., New York.
Lockwood Memorial Library, University of Buffalo.
Maharaja's College, Ernakulam, India.
National Council of Applied Economic Research, New Delhi.
Nottingham & District Technical College, Nottingham.
Seminar für Rechts-und-Wirtschaftswissenschaft, Universität, Mainz.
Skidmore College Library, Saratoga Springs, New York.
Social Science Research Library, Seoul, Korea.
Somervell Bros. Ltd., Kendal.
Stephen F. Austin State College, Nacogdochas, Texas.
University of Illinois Library, Chicago. Undergraduate Division.

RECENT PERIODICALS AND NEW BOOKS

Journal of the Royal Statistical Society

VOL. 120, PART 2, 1957. *An Inquiry Concerning Interviewer Variability:* K. GALES and M. G. KENDALL. *Economic Acceptance Sampling Schemes:* G. HORSNELL. *Changes in the Proportions of Male Colour Types during the Period 1914–39:* A. J. LEA. *A Method of Estimating Surplus Labour in Peasant Agriculture in Over-populated Under-developed Countries:* N. K. SARKAR. *Unit Value and Volume Index Numbers of Inter-area Trade:* A. MAIZELS.

VOL. 120, PART 3, 1957. *The Measurement of Productive Efficiency:* M. J. FARRELL. *The Use of Electronic Data Processing Equipment:* J. H. H. MERRIMAN and OTHERS. *An Application of Linear Programming to the Transport of Coking Coal:* A. H. LAND. *The Mathematical Relation between the Number of Diseases and the Number of Patients in a Community:* G. HERDAN. *Sentence-length Distributions of Greek Authors:* W. C. WAKE.

Applied Statistics

VOL. VI, NO. 2, JUNE 1957. *Evolutionary Operation: A Method for Increasing Industria Productivity:* G. E. P. BOX. *Some Statistical Applications of Electronic Computers:* S. LIPTON. *"Three-Group" Regression Analysis: Part I: Simple Regression Analysis:* W. M. GIBSON and G. H. JOWETT. *Discriminant Functions of Socio-economic Class:* K. GALES. *The Study of Variability in Engineering Design:* S. J. MORRISON. *A Simple Survey with Both a Postal and an Interview Stage:* P. G. GRAY.

Economica

VOL. XXIV, NO. 95, AUGUST 1957. *National Wage Policy in the Netherlands:* B. C. ROBERTS. *The British National Debt: Part I:* E. G. JONES and E. NEVIN. *Method and Analysis in David Hume's Economic Essays:* D. VICKERS. *Tariffs, Subsidies and the Terms of Trade:* W. M. CORDEN. *Notes on the Place and Significance of the Money Multiplier:* E. J. MISHAN.

Oxford Economic Papers

VOL. 9, NO. 2, JUNE 1957. *Anglo-American Economic Relations in War-time:* R. OPIE. *Classical Growth:* I. M. D. LITTLE. *An International Comparison of "Over-employment" Trends in Money Wages:* C. CLARK. *Changing Economic Thought in Poland:* P. J. D. WILES. *Communism and the Price System: I: On the Role of the Law of Value in Socialist Economy:* W. BRUS; *II: In the Pincers of the Law of Value:* J. PAJESTKA. *A Note on Productivity Changes and the Terms of Trade:* A. ASIMAKOPULOS. *Mr. Newman on Revealed Preference:* H. S. HOUTHAKKER.

The Review of Economic Studies

VOL. XXIV, NO. 65, JUNE 1957. *The "Transformation Problem":* F. SETON. *Stability in a Closed Economy and in the Foreign Exchange Market, and the Redistributive Effect of Price Changes:* J. SPRAOS. *The Compatibility of any Behaviour of the Price Level with Equilibrium:* J. C. GILBERT. *Demand Theory without a Utility Index:* L. MCKENZIE. *A Note on Bond-holding and the Liquidity Preference Theory of Interest:* F. P. BRECHLING. *Index Numbers and Demand Analysis:* M. C. KEMP. *Notes on the Theory of Stability of Multiple Exchange:* M. MORISHIMA. *Multiplier Theory and Fiscal Policy:* A. HAGGER. *Mr. Gehrels on Customs Unions:* R. G. LIPSEY. *A Reply to Mr. Kemp:* A. R. BERGSTROM.

The Manchester School of Economic and Social Studies

VOL. XXV, NO. 2, MAY 1957. *The Growth of Life Assurance in U.K. since 1880:* J. JOHNSTON and G. W. MURPHY. *An Engel-type Curve for Cash:* J. SPRAOS. *Private Company Finance in the Post-war Period:* F. R. JERVIS.

Scottish Journal of Political Economy

VOL. IV, NO. 2, JUNE 1957. *Organisation in Two Nationalised Industries:* A. E. THOMPSON. *The Span of Control:* L. F. URWICK. *Gorbals: A Study in Redevelopment:* T. BRENNAN. *Two Scottish West Indian Liquidations after 1793:* S. G. CHECKLAND. *The Labour Theory of Value:* H. D. DICKINSON.

The Economic History Review

VOL. X, NO. 1, AUGUST 1957. *Treasure Hoards in the Italian Economy, 960–1139:* D. HERLIHY. *Deficit Financing in the Reign of James I:* R. ASHTON. *The Social Structure in the Eighteenth Century: a Calculation by Hoseph Massie:* P. MATHIAS. *The British Standard of Living, 1790–1850:* E. J. HOBSBAWM. *Buganda: An Outline Economic History:* C. C. WRIGLEY.

The Journal of Industrial Economics

VOL. V, NO. 3, JULY 1957. *Letters Patent for Inventions: Their Use and Misuse:* G. A. BLOXAM. *Crude Oil Prices in the United States at the Gulf Coast:* W. A. LEEMAN. *The Relationship between Wage and Effort:* W. BALDAMUS. *Flour Pricing and the Miller's Margin:* J. M. BELLAMY. *The Stated Qualifications of Directors of Larger Public Companies:* D. P. BARRITT. *Selective Studies in Alternative Manhour Costs:* S. MELMAN, A. CALDERARO and J. SURIDIS. *Financial Provision for Research and Development in Industry:* J. F. COALES.

Bulletin of the Oxford University Institute of Statistics

VOL. 19, NO. 2, MAY 1957. *Savings Behaviour: A Symposium. Tests of the Life Cycle Hypothesis of Savings:* F. MODIGLIANI and A. K. ANDO; *Savings and the Balance Sheet:* M. FRIEDMAN; *Expectations and Consumer Behaviour:* T. P. HILL; *Econometric Analysis of the Savings Survey Data:* T. HAAVELMO; *The Significance of Income Variability on Savings Behaviour:* L. R. KLEIN and N. LIVIATAN; *An Evaluation of the Tests:* J. TOBIN and H. WATTS; *Some Conditions for Progress in the Study of Savings:* I. FRIEND; *The Danger of Over-simplification:* J. D. SARGAN; *A Reply to the Critics:* M. R. FISHER.

Yorkshire Bulletin of Economic and Social Research

VOL. 9, NO. 1, MAY 1957. *Self-contradiction in Leontief's Dynamic Model:* M. MCMANUS. *Economic Theory in Great Britain Today:* J. C. GILBERT. *Progress in the United Kingdom Iron and Steel Industry:* E. T. SARA. *Real Earnings in Sheffield, 1851–1914:* S. POLLARD.

Political Studies

VOL. V, NO. 2, JUNE 1957. *The Development of Political Organizations in Kenya:* G. BENNETT. *The Independent Member in Ireland:* B. CHUBB. *Some Notes on the Standing Committees of the French National Assembly:* P. A. BROMHEAD. *J. S. Mill and Democracy, 1829–61: I:* J. H. BURNS. *Political Decision in Opposition:* R. T. MCKENZIE.

The British Journal of Sociology

VOL. VIII, NO. 2, JUNE 1957. *The British Sociological Association Conference, 1957:* R. FLETCHER; *Social Theory: Retrospect and Prospect:* D. G. MACRAE; *The Role-set: Problems in Sociological Theory:* R. K. MERTON; *Social Investigation: Past Achievements and Present Difficulties:* T. S. SIMEY; *Primordial, Personal, Sacred and Civil Ties:* E. SHILS; *Social Research and Social Policy in the Nineteenth Century:* O. R. MCGREGOR; *Sociology and Social Policy:* G. D. H. COLE; *Reports of Group Discussions. The Social Grading of Occupations in Brazil:* B. HUTCHINSON.

VOL. VIII, NO. 3, SEPTEMBER 1957. *Social Conflict and the Theory of Social Change:* L. A. COSER. *Notes on the Use of Statistics in Social Administration:* J. P. MARTIN. *Primitive States:* P. M. KABERRY. *Social Stratification and Intellectual Roles in the Negro Community:* W. RECORD. *A Sociological Theory of Economic Administration:* W. BALDAMUS. *A Mathematical Presentation of Israel's Political Parties:* T. M. GOODLAND. *Ice-breaking for Sociologists:* S. J. GOULD.

The Sociological Review

VOL. 5, NO. 1, JULY 1957. *The Search for a Laic Morality under the French Third Republic: Renouvier and the "Critique Philosophique":* H. TINT. *The Changing Role of Local Democracy: The Trade Union Branch and its Members:* T. E. STEPHENSON. *The Distribution of Social Defects in Liverpool:* I. M. CASTLE and E. GITTUS. *The Use of Models for Social Economic Structures:* F. ZWEIG. *The Group Discussion as an Interview Technique:* J. A. BANKS. *Family or Sibship Position and Scholastic Ability:* J. P. LEES and A. H. STEWART. *Family and Authority: The German Father in 1955:* R. KÖNIG.

Population Studies

VOL. XI, NO. 1, JULY 1957. *A Demographic Study of the British Ducal Families:* T. H. HOLLINGSWORTH. *The Measurement of Population Distribution:* O. D. DUNCAN. *Social Ambitions of the Bourgeoisie in Eighteenth Century France, and their Relation to Family Limitation:* J. G. C. BLACKER. *Death Rates, Age Distribution and Average Income in Stationary Populations:* L. JOHANSEN. *The Fertility of Teachers in England and Wales:* W. SCOTT. *Applicants for Assisted Migration from the United Kingdom to New Zealand:* L. B. BROWN.

The Farm Economist

VOL. VIII, NO. 9, 1957. *International Pattern of Demand for Foodstuffs:* D. BASU and G. T. JONES. *A Statistical Study of the Productivity on Cambridgeshire Farms:* F. G. FORSYTH. *A Note on the Decline in Numbers of Farmworkers in Great Britain:* J. D. HUGHES. *Statistics of Owner-occupation of Farms in England and Wales for 1927:* S. G. STURMEY. *A Note on Research Methodology and Peasant Agriculture:* A. MARTIN.

VOL. VIII, NO. 10, 1957. *Monopolistic Tendencies in the Chemical Fertilizer Industry:* H. FRANKEL. *International Pattern of Demand for Foodstuffs in 1954: Mathematical Analysis of the Data:* D. BASU and G. T. JONES.

The Agricultural History Review

VOL. V, PART II, 1957. *Some Recent Danish Experiments in Neolithic Agriculture:* A. STEENSBERG. *The British Plough: Some Stages in its Development:* F. G. PAYNE. *The Rabbit in England:* E. M. VEALE.

Journal of Agricultural Economics

VOL. XII, NO. 3, JUNE 1957. *The Future Pattern of Food Consumption in the United Kingdom:* A. W. ASHBY. *Some Problems of Land Tenure:* A. H. MAUNDER. *Developments in Farm Management Advisory Work in the Eastern Countries:* D. B. WALLACE. *The Significance of Variation in Annual Farm Profits:* Z. W. TANSEY. *Some Short-term Forecasting Methods:* F. HOLME. *Teaching Farm Management in a Three Year Degree Course:* E. M. CARPENTER. *A Review of the Fresh Milk Market in England and Wales, 1939 to 1956:* J. EMPSON. *A Note on Cereal Prices and Acreages:* T. W. GARDNER.

Journal of the Institute of Actuaries

VOL. 83, PART I, NO. 363, 1957. *Continuous Investigation into the Mortality of Assured Lives: Memorandum on a Special Inquiry into the Distribution of Duplicate Policies. The Effect of Bankruptcy on Non-assignable Annuities:* D. HOUSEMAN. *The Effect of Taxation on Damages and Compensation for Loss of Incomes:* D. HOUSEMAN.

The Incorporated Statistician

VOL. 7, NO. 4, APRIL 1957. *Cost Accounting and Statistics:* J. A. REECE. *The Design of Experiments: II: The Nature of Measurements:* M. J. MORONEY. *The Generation of Income Distributions: Some Illustrative Models:* D. G. CHAMPERNOWNE. *Diagrams for Rapid Estimation of Partial Correlation Co-efficients:* F. D. LIDDELL.

The Banker

VOL. 107, NO. 377, JUNE 1957. *Monetary Strategy Now. A Commonwealth View of Sterling. America's Drift from the Factory:* E. L. DALE. *Confessions of a Reflationist: I: The Moment of Policy's Turning:* N. MACRAE. *Montagu Norman in Perspective:* E. V. MORGAN. *German Banking Changes Back:* W. RINGLEB. *America's Changing Banking Scene: III: The Money Market:* J. S. G. WILSON.

VOL. 107, NO. 378, JULY 1957. *Europe's Problem Currencies. Canada's Economy Now:* E. P. NEUFELD. *Confessions of a Reflationist: II: The Inheritance from Stagnation:* N. MACRAE. *New Deal for Rents:* C. JONES. *America's Changing Banking Scene: IV: The Federal Reserve:* J. S. G. WILSON. *Lombard Street in Calmer Waters:* J. GRAHAME-PARKER.

VOL. 107, NO. 379, AUGUST 1957. *Wanted—Leadership. Central Banks for New Dominions:* I. GREAVES. *Could Europe's Oil be Cheaper?:* D. OVENS. *Squeeze in Abeyance. Can Ireland Face Europe?:* J. MEENAN.

VOL. 107, NO. 380, SEPTEMBER 1957. *Europe's Currency Cauldron: A New Deal?; The Dollar Problem Reconsidered; The German View:* R. E. LUKE. *Attrition in Fleet Street:* J. E. HARTSHORN. *Superannuation for All?:* M. SHANKS. *Taxation of Overseas Profits:* G. WHILLANS.

VOL. 107, NO. 381, OCTOBER 1957. *Expedient or Cure? Exchange Priorities Now. Ottawa and Europe. Commodities Face a Test:* F. CASSELL. *The Economics of Algeria: I: Frenchman's Burden:* J. W. SAXE. *The "Fed" Rejects Inflation. Australia's Second Banking Reform:* J. O. N. PERKINS.

The Bankers' Magazine

VOL. CLXXXIII, NO. 1359, JUNE 1957. *Light on Montagu Norman's Policy:* SIR R. HAWTREY. *Switzerland: Fifty Years of the Swiss National Bank:* R. PFENNINGER; *The Swiss Industries Fair, 1957:* H. HAUSWIRTH; *Trends in the Swiss Capital Market:* E. BADER; *The Importance of Switzerland as a Financial Centre:* A. SCHAEFER. *European Economic Welfare and Oriental Industrialisation:* W. ROBERTSON.

VOL. CLXXXIV, NO. 1360, JULY 1957. *Our New Index Number. The Scope and Limitations of Monetary Policy:* W. F. CRICK.

VOL. CLXXXIV, NO. 1361, AUGUST 1957. *Fighting Inflation. The Banking Half-year. The Cheques Act, 1957:* J. M. HOLDEN. *The Reorganisation of the Austrian Capital Market:* F. SCHEU. *Survey of Economic Conditions in the U.S.A.: Growing Signs of a Gradual Decline.*

VOL. CLXXXIV, NO. 1362, SEPTEMBER 1957. *Hire Purchase in Small Manufacturing Business, Part I:* J. A. BATES. *Alpbach and Integration:* G. H. MORRISON. *Bankruptcy Law Amendment.*

VOL. CLXXXIV, NO. 1363, OCTOBER 1957. *Bank Rate in Action. The Bankers and Monetary Policy:* E. NEVIN. *Adjusting Deutschmark without Tricks:* K. RICHEBÄCHER. *The Future of European Monetary Policy. Hire Purchase in Small Manufacturing Business, Part II:* J. A. BATES. *The Come-back of the German Big Three Banks:* H. J. PANTEN.

Barclays Bank Review

VOL. XXXII, NO. 3, AUGUST 1957. *Sterling Today. The International Finance Corporation. Economic Progress in South Africa.*

District Bank Review

NO. 122, JUNE 1957. *The European Free Trade Area:* S. R. DENNISON. *Housing After the Rent Act:* A. C. L. DAY.

NO. 123, SEPTEMBER 1957. *The Control of Industrial Location:* J. SYKES. *Towards Better Farming:* C. A. COOKE. *The Upsurge of Inflation.*

Lloyds Bank Review

NO. 45, JULY 1957. *Britain Revisited:* SIR S. CAINE. *Switzerland Copes with Prosperity:* G. SOLOVEYTCHIK. *The Future of Local Government Finance:* J. WISEMAN.

NO. 46, OCTOBER 1957. *The "Norman Conquest" Reconsidered:* SIR T. GREGORY. *How much more Inflation in the U.S.?:* D. M. KEEZER and E. R. EGGERS. *Science and Industry:* T. WILSON.

Midland Bank Review

AUGUST 1957. *The History of Retirement Pensions. The Ministry of Agriculture, Fisheries and Food.*

National Provincial Bank Review

No. 39, AUGUST 1957. *Price Policy in a Period of Continuing Inflation:* P. T. MENZIES. *Towards a Community of Purpose:* W. C. WALGATE.

The Three Banks Review

No. 34, JUNE 1957. *Japan and the General Agreement on Tariffs and Trade:* J. E. MEADE. *Flat Racing and Thoroughbred Breeding in England Today:* J. HISLOP.

No. 35, SEPTEMBER 1957. *The Economics of National Superannuation:* A. T. PEACOCK. *Fare-fixing in Air Transport:* A. H. FOX. *The Royal Bank and the Scottish Economy, 1727–60:* H. HAMILTON.

Westminster Bank Review

AUGUST 1957. *The Economics of the Theatre:* A. DUKES. *Household Durables and the "Squeeze":* M. WRAY. *Automation and Productivity, Competition and Incentives:* S. B. BAILEY. *The Too-prolific Hen:* H. FRANKEL.

Planning

VOL. XXIII, No. 411, JUNE 1957. *Trade Fairs and Exhibitions.*
VOL. XXIII, No. 412, JULY 1957. *Free Trade and Social Security.*
VOL. XXIII, No. 413, AUGUST 1957. *Postage and Philately.*
VOL. XXIII, No. 414, SEPTEMBER 1957. *Designs for Europe.*

Town and Country Planning

VOL. XXV, No. 7, JULY 1957. Special number on Hampstead Garden Suburb.

VOL. XXV, No. 8, AUGUST 1957. *Cities in Flood:* D. HEAP. *Canada Needs Regional Planning:* N. PEARSON.

VOL. XXV, No. 9, SEPTEMBER 1957. *Urban Dispersal Policy. Soviet Union to Build New Towns:* D. HOJAYEV. *Space for our Congested Cities:* C. FEISS. *Spain's Housing Policy:* G. D. HARPMAN.

VOL. XXV, No. 10, OCTOBER 1957. *Addis Ababa: The Master Plan:* G. B. DIX. *A Manifesto against Ugliness:* H. R. LUCE. *The Welsh "Quadrilateral":* B. E. CRACKNELL.

The Journal of the Institute of Transport

VOL. 27, No. 5, JULY 1957. *Railway Freight Charges:* A. A. HARRISON. *Tankers: Past Present and Future:* A. S. C. HULTON. *Passenger Transport in Britain: What Next?:* A. B. B. VALENTINE.

VOL. 27, No. 6, SEPTEMBER 1957. *European Air Transport Economics:* S. WHEATCROFT. *The Staff Problem in Transport:* A. BULL.

Progress

VOL. 45, No. 254, SPRING 1957. *"Anti-Trust" in the United States:* A. FORTAS. *The National's Share in Management: A Problem for the International Business:* F. J. PEDLER. *School for Merchant Venturers:* E. B. J. POSTMA. *The Leverhulme Trust:* SIR M. CLIFFORD. *Productivity on the Farm:* A. W. HASLETT. *A New Aim for Progressive Thought:* P. KUIN.

VOL. 46, No. 255, SUMMER 1957. *The "Investment League":* A. K. CAIRNCROSS. *The Royal Tropical Institute, Amsterdam:* SIR R. WINGATE. *Structure and Level of World Trade:* P. R. TOWELL. *The Grand Banks of the South:* E. ROSENTHAL. *Malaya's Plans for the Future:* E. M. K. JOHARI.

Statistical and Economic Review (The United Africa Company)

No. 20, SEPTEMBER 1957. *The Finance of Development in Tropical Africa: I.*

Hard Fibres

No. 25, JUNE 1957. *World Situation. The U.S. Cordage Industry.*
No. 26, SEPTEMBER 1957. *World Situation. Mexican Henequen.*

The Economic Record

VOL. XXXIII, NO. 64, APRIL 1957. *The Australian Economy, April 1957:* P. H. KARMEL. *Wage Rates, the Cost of Living and the Balance of Payments:* J. E. MEADE and E. A. RUSSELL. *The Calculation of the Cost of Protection:* W. M. CORDEN. *A Production Function from Farms in the Whole-milk Region of Western Australia:* H. P. SCHAPPER and R. G. MAULDON. *Arbitration in a New Key:* K. F. WALKER. *Spatial Competition and Sheltered Industries:* W. T. DOWSETT. *E. G. Wakefield and the Alienation of Crown Land in New South Wales to 1847:* K. BUCKLEY. *An Estimate of the Magnitude of Income Redistribution in New Zealand:* C. WEYSTRATE.

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No. 6, 1957. *The Work of Financial Organisations Must Be at the Level of Their New Tasks. On Unfinished Construction and the Commissioning of Fixed Capital:* V. ROBOTOV. *Some Questions on the Strengthening of Cost Accounting in Industry:* V. GANSHTAK. *Profoundly Study the Economics of Production:* M. ZAKHAROV. *The Reform of the Revenue Departments:* V. SAMOILOV. *On the Enterprise Fund:* R. KORAGEDOV. *Improve the Role of Incentive Funds:* V. MITROFANOV. *Savings Banks in Bulgaria:* I. PALIISKY. *The 1957 Budget of the Korean Democratic People's Republic. Corporation Reports of the Monopolies of the U.S.A. in 1956:* I. VEITSMAN.

Dengi i Kredit (*Russian text*)

No. 4, 1957. *Improve the Organisation of Industrial and Construction Management. Ways to Develop Mutual Clearing:* E. MITELMAN. *Reinforce the Links between the State Bank and the Collective Farms:* SH. BULUSHEV. *Accounting and Credit on the Railways:* I. GARBER and M. PESSEL. *Resources for Paying Off Loans for the Introduction of New Technology and their Computation:* M. YAMPOLSKY. *The Strengthening of the Trend towards Concentration among U.S.A. Banks:* V. USOSKIN.

No. 5, 1957. *The Work of the State Bank—to the Level of Its New Tasks. Suggestions on the Administration of Regional Branches of the State Bank* (*Leningrad:* N. POZDNYAKOV; *Moscow:* Z. DEGTVAREV; *Sverdlovsk:* I. KOPYLOV; *Latvia:* L. KHOKHLOV and N. ZILBERSHTEIN). *On the Problem of the Essence and Functions of Money in a Socialist Society:* I. DYMSHITS. *Travellers' Cheques Issued by the Banks of Socialist Countries:* A. ALTSHULER. *Credit Control Since the War in the Capitalist Countries:* A. EIDELNANT.

Ekonomista (*Polish text, English and Russian summaries*)

No. 3, 1957. *The Problem of The Profitability of Agricultural Production in Peasant Farms:* A. BRZOZA. *The Influence of Economic Incentives on Agricultural Production:* H. CHOŁAJ. *On the Problems of the Profitability of State Farms:* T. RYCHLIK. *The Economic Problems of Automation in Capitalist Countries:* M. KALECKI and A. SZEWORSKI. *Economic Problems in the Wrocław (Breslau) Correspondence of Karl Marx:* S. SCHWANN. *Changes in the Social Structure of the Small Peasantry in People's Poland:* M. DZIEWICKA. *From Research on the Housing Situation in People's Poland:* A. ANDRZEJEWSKI. *Some Problems of Linear Programming:* W. TOMASZEWSKI. *Problems of Regulation of Monopoly and Competition:* J. GRZYWICKA. *Y. Poniatowski on the Economic Situation of Polish Agriculture after the War:* M. CIEPIELEWSKA. *Against Simplification in Studies of the Situation of the Working Class:* J. POPKIEWICZ and F. RYSZKA.

Planované Hospodářství (*Czech text*)

No. 3, 1957. *Completing the Building of Socialism in Czechoslovakia by Developing Co-operative Farming:* J. KŇÁKAL. *Problems Relating to the Manufacture and Development of Machine Tools in Czechoslovakia:* Z. ŠVÁBENSKY. *Theoretical Problems of Raising the Economic Effectiveness of Directing the National Economy:* Z. VERGNER. *On Economic Incentives for Raising the Effectiveness of Industrial Production.*

No. 4, 1957. *Problems Concerning Building Work in Progress and Uncompleted Sites:* E. ČERVENÝ. *The Economic Development of the Indian Republic:* A. ŽIŽKA. *On the Organisation of the Garment Industry. Questions of Forming and Planning Prices:* V. JANZA. *Raising the Efficiency of the National Economy by Using Economic Incentives:* F. BOREŠ.

No. 5, 1957. *Raising the Efficiency of the Exploitation of Sources of Power in Czechoslovakia:* M. RATAJ. *The First Results of the Shortened Working Week:* M. PICK. *Reserves in Lowering Production Costs in the Engineering Industry:* J. HLÍDEK. *How Agricultural Production and Marketing Will be Planned Next Year:* M. PARKAN. *The Planning of Wholesale Prices:* O. ŠIK. *Evaluating the Economic Effectiveness of Technical Development.*

No. 6, 1957. *Certain Economic Questions Relating to the Construction of Thermal Power Plants:* V. TKAČEV. *Measuring Labour Productivity in the Building Industry:* J. KOMÁREK. *Raising the Quality of the Training of Agricultural Specialists:* J. JANOVIC. *For the Development of International Co-operation in the Field of Power:* F. HOMOLA. *Theoretical Problems Involved in the Direction of the National Economy:* R. KOCANDA. *Problems Concerning the Planning and Fixing of Prices in the Engineering Industry:* V. HANUŠ.

Finansi i Kredit (*Bulgarian text*)

No. 3, 1957. *Bulgarian–Soviet Friendship—the Guarantee for New Economic Successes. For Successful Fulfilment of the State Budget for 1957. Some Problems on Planning and Collecting Profits Taxes:* G. PETROV. *How to Use Soviet Experience in the Matter of Capital Investment:* I. PALIISKY. *Accumulation Plans in Municipal Enterprises:* I. PETKOV. *The Appeal to Workers in Industry, Electrification and Transport and the Tasks of Financial and Bank Workers:* A. STOICHEV.

No. 4, 1957. *Vladimir Ilich Lenin. The Tasks of the Ministry of Finance and State Control in 1957:* K. LAZAROV. *For Successful Collection of State Revenues in 1957:* YA. YANEV. *On the Question of a Further Strengthening of Economic Accounting in Industrial Enterprises:* V. NANKOV. *The Contract System in Purchasing Agricultural Produce:* T. DONCHEV. *For Improved Financial Standards in Collective Farms:* K. ZANEV. *On Accounting the Value of Production:* S. STRUMILIN.

No. 5, 1957. *An Improvement in the Organisation and Control of Soviet Industry and Construction. The Struggle for Higher Profitability in Industrial Enterprises as a New Form of Socialist Competition:* V. RANKOV. *How to Show the Money Income and Outlay Balance of the Population in 1957:* N. GUGOVSKY. *The Finance and Control by the Bulgarian Investment Bank of Beyond-limit Capital Outlays on State Farms:* D. MINKOV. *The New Settlements System:* P. KHAVEZOV. *Bring Order into the Payments Methods on Co-operative Farms:* G. STOIROV. *Verification of Turnover Tax Returns by Local Retail Co-operative Societies:* P. TYANKOV.

No. 6, 1957. *For a Higher Level of Work on the Draft 1958 Budget. Some Problems of Financial Practice and Science:* D. BAZHDAROV and G. PETROV. *Successes among Consumer Co-operatives:* K. KAMENOV. *Turnover Taxes and Procurement Prices:* S. TODOROV. *Foreign Exchange and Financial Control under Socialism:* R. DELCHEV. *How the Kiev Savings Banks Work:* R. DELCHEV.

Ikonomicheska Misl (*Bulgarian text, French and Russian summaries*)

No. 2, 1957. *The New Economic Aid from the Soviet Union. The 1957 State Budget:* K. LAZAROV. *Coal and the Bulgarian Fuel Problem:* I. BAICHEV. *Charles Fourier—The Great Utopian Socialist:* P. SPIRKOV. *Lenin and the Peaceful Coexistence of Two Systems:* S. SUKMANDZHIEV. *Some Problems of Cost Calculating on Labour. Collective Farms:* L. GLYUMEZOV. *Costing on Labour-Collective Farms:* K. KIRYAKOV.

Planovo Stopanstvo (*Bulgarian text*)

No. 2, 1957. *The Improvement of the System for Buying Agricultural Produce—an Important Factor in Increasing Agricultural Output:* S. SYULEMEZOV. *The 1957 Capital Investment Plan and the Development of the Economy:* P. TOPCHIEV. *International Trade in Some of Our Traditional Agricultural Exports:* K. TSANKOV and ZH. IVANOV. *Trends in the Development of Our Motor Vehicle Park and Demand for Various Types of Fuel:* Z. ZLATEV. *Setting Limits for Working Capital in Industrial Enterprises:* L. APOSTOLOV.

Probleme Economice (*Rumanian text, French and Russian summaries*)

No. 5, 1957. *Labour for the Community and the General Processes of the Socialist Economy: The Calculation of the Cost-of-Living Index and of Real Wages:* M. BIJI and V. TREBICI. *Some Aspects of the Problem of Excess Stocks:* M. SIBIANU and V. CHIRIAC. *Agricultural Collectivisation in the Timişoara Region:* N. BELLI. *Consumer Co-operatives and the Development of Commercial Exchange between Town and Country:* GH. FEŢEANU. *Some Problems Relating to the Socialist Transformation of Capitalist Industry by Peaceful Means in the Chinese People's Republic:* I. BURŞTEIN. *On the Agrarian Crisis at the End of the Nineteenth Century in Rumania:* N. MARCOU. *On the Western European "Common Market":* N. GODAN and V. VOLOŞENIUC.

Statisztikai Szemle (*Hungarian text, English and Russian summaries*)

MARCH 1957. *Preliminary Demographic Data for the Year 1956:* A. KLINGER. *Examination of Meteorological Factors Influencing Sugar Beet Production:* I. MÉSZÁROS. *An Outline of the Input–Output System—II:* Z. KENESSEY, V. NEMÉNY and GY. SZAKOLCZAI. *Problems of Socio-Professional Classification:* P. DEMÉNY. *Hungary's Foreign Trade with European Capitalist Countries (1945–1956):* L. KERÉNY. *Remarks on the Problem of National Income Derived from Foreign Trade Activities:* J. BENEDECZKI and L. DRECHSLER. *Some Problems of Coal Processing in the Chemical Industry:* M. KISTELEKI-STILLER and T. VINCZE. *General Censuses:* L. HÉJA.

APRIL–MAY 1957. *On the Komló Investments:* F. DEÁK and L. SZILÁGYI. *Why do Eloquent Figures Keep Silence?:* A. MÓD. *Consumption of Milk and Dairy Products in Hungary:* M. ZAFIR. *The Statistical Application of the Geometric Mean:* P. KOVES. *Timely Problems of our Demographic Policy:* K. MILTÉNY. *A Comment:* J. RÉDEI. *Some Problems of the Economic Interpretation of Index Numbers:* G. HAJPÁL. *The Branch Structure of Industry:* G. PÁL.

JUNE 1957. *The New Index of Industrial Production:* Z. ROMÁN. *The Resolution of the Board of the Central Statistical Office on the Computation of Production Indices in Industry. The Role of the 1949–56 Regrouping of Farm Plots and Their Impact on Our Agriculture:* L. BORBÉLY. *Methodological Questions on the History of the Computation of National Income:* R. HORVÁTH. *The Library of the Central Statistical Office:* J. KOVACSICS. *A New General Statistics Textbook in the German Democratic Republic:* P. KÖVES and G. PÁRNICZKY. *Trends of Labour Productivity and Average Earnings in State Industry:* A. NYILAS. *Meeting of the Methodological Committee for Industry and Building of the Central Statistical Office. The Statistical Actvity of the United Nations Organisation:* Z. KENESSEY. *Strengthening the Central Statistical System in the Soviet Union.*

Közgazdasági Szemle (*Hungarian text, English and Russian summaries*)

No. 5, 1957. *Costs of Production and the Balance-sheet of the National Economy:* GY. TAUSZK. *The Role of Price in the Socialist Economy:* B. NAGY. *Specific Features of a Modern Capitalism:* A. HAÁSZ. *The Present and Prospective Situation of Hungarian Metallurgy:* L. KISMARTY. *On the Planned Development of Agriculture:* K. GARAMVÖLGYI. *Objectives and Methods of Econometric Research:* K. KÁDAS.

No. 6, 1957. *The Main Proportions of the Economic Plan for 1957:* GY. SOMOGYI. *New Facts on Soviet–Hungarian Trade:* L. KÖVÁRY and GY. LÁZÁR. *The Overcoming of Inflation—Our Reserves and Prospects:* A. MÓD. *Market Control—Its Role and the Means of Carrying it into Practice:* V. SÁGHY. *On the Correlation of National Income and Foreign Trade in Hungary:* T. KISS.

No. 7, 1957. *Problems of Economic Policy and the 1957 Plan:* I. FRISS. *Remarks on the 1957 Economic Plan:* J. BOGNÁR. *The State as an Economic Factor in Modern Capitalism:* A. HAÁSZ. *On Wages and Income Distribution in Co-operatives:* F. ERDEI. *The New Soviet Method of Industrial Management:* E. REDÖ. *"Economic Mechanism" or "Economic Policy"?:* GY. VARGA.

Nos. 8–9, 1957. *Our Economic Tasks:* J. FOCK. *The Reorganisation of Industrial Producer-Prices:* B. NAGY. *Hungarian Foreign Trade Problems:* J. BOGNÁR. *Experiences in the Management of Industrial Enterprises:* J. BÁLINT and OTHERS. *A Practical Method of Assessing the Economics of Export:* GY. ERÖS and OTHERS. *Some Aspects of Hungarian Prospects and Possibilities:* M. KÖKÉNY. *Aspects of Social–Economic Relationships in Farm Co-operatives:* F. FEKETE. *On Income Distribution in Farm Co-operatives:* L. MARKÓ. *Capital Accumulation in Bulgaria:* J. NATAN. *Some Correlations between Industrialisation and Foreign Trade in Underdeveloped Countries:* F. MOLNÁR.

NEW BOOKS

British

ADDIS (J. P.). The Crawshay Dynasty. A study in industrial organisation and development, 1765–1867. Cardiff: University of Wales Press, 1957. 9″. Pp. xiv + 184. 12*s.* 6*d.*

[To be reviewed.]

ASHWORTH (H.). Housing in Great Britain. London: Thomas Skinner (330 Gresham House, Old Broad Street, E.C.2.), 1957. 8½″. Pp. 157. 7*s.* 6*d.*

[This is designed primarily as a text-book for those preparing for the Final Examination of the Building Societies Institute. The author is General Manager and Secretary of the Co-operative Permanent Building Society. The book does not set out to be an original contribution to thinking on the subject, but it brings together a good deal of information in convenient form. Part I, on Housing Policy, consists of largely factual survey of present housing needs—with brief but sensible

remarks on the ambiguities of this concept—viewed in relation to the existing stock of houses, its prospective rate of obsolescence and the prospective rate of family formation. This Part contains also an historical account of house building and housing policy in the present century, and a survey of sources of finance and of the trend of house prices and building costs since the War. Part II, on Housing Standards, is more technical, but contains a useful compact summary of the pros and cons of different designs of dwelling.]

BASTIN (J.). The Native Policies of Sir Stamford Raffles in Java and Sumatra. An economic interpretation. London: Oxford University Press, 1957. 8½″. Pp. xx + 163. 30*s*.

[To be reviewed.]

BELL (C.). Survey of International Affairs, 1954. Edited by F. C. BENHAM. London: Oxford University Press for the Royal Institute of International Affairs, 1957. 9½″. Pp. 329. 45*s*.

FOLLIOT (D.). (Ed.). Documents on International Affairs, 1954. London: Oxford University Press for the Royal Institute of International Affairs, 1957. 9½″. Pp. 368. 55*s*.

[These two volumes are complementary to each other, but each is designed so as to be suitable for use independently. The main focus of international affairs in 1954 was in South-East Asia and the Far East, with the termination in Indo-China of the last full-scale armed conflict between the communist world and the western world. The events in this area accordingly occupy a large part of the Survey. In the Documents volume relatively more space is devoted to affairs in Europe and the Middle East.]

A Bibliography in Economics for the Oxford Honour School of Philosophy, Politics and Economics. Compiled by LADY HALL, G. B. RICHARDSON and J. R. SARGENT. London: Oxford University Press, 1957. 8½″. Pp. 80. 6*s*. 6*d*.

[This replaces the similar Bibliography that was issued in 1950, and like it arranges the material according to the papers set in the Oxford P.P.E. examination. The 1950 Bibliography was a useful compilation, but it reflected markedly the individual interests of its editors and was much stronger in some fields than in others. The present publication, as well as being up-to-date and generally more comprehensive, is also better balanced. Its compilers are to be congratulated on having produced what is the best and most thorough classified bibliography of economics at present available. The amount of material included—journal articles as well as books—is remarkable, and undergraduates reading P.P.E. will be relieved to learn from the preface that not all the two thousand or so items included are to be regarded as indispensable. Its usefulness will by no means be confined to Oxford. Since it is likely to have a wide circulation, might the Oxford University Press consider the publication of an interleaved edition, for teachers of economics to make their own additions and keep the coverage up-to-date?]

CLARK (C.). The Conditions of Economic Progress. Third Edition. London: Macmillan, 1957. 9″. Pp. xiv + 720. 70*s*.

[To be reviewed.]

CLEGG (H. A.) and CHESTER (T. E.). Wage Policy and the Health Service. Oxford: Basil Blackwell, 1957. 9″. Pp. 142. 18*s*. 6*d*.

[To be reviewed.]

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF BRISTOL. Cropping and Crop Costs in South West England, 1955; Report No. 97; 10½″, Pp. 85, 2*s*. 6*d*. An Economic Study of Pig Production in South West England, 1955–56, by E. BURNSIDE and R. C. RICKARD; Report No. 99; 9″, Pp. 48, 2*s*. 6*d*. Newton Abbot: Department of Agricultural Economics, University of Bristol, 1957.

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF BRISTOL. A Farmer's Guide to Incentive Schemes, by W. M. STRONG. Report No. 98. Newton Abbot: Department of Agricultural Economics, University of Bristol, 1957. 10½″. Pp. 30. 2*s*. 6*d*.

[A brief survey of the incentive payments schemes appropriate to different types of agricultural work and their advantages and disadvantages.]

The Dock Worker. An analysis of conditions of employment and industrial relations in the Port of Manchester. Department of Social Science, University of Liverpool, Social Research Series. Liverpool: Liverpool University Press, 1956. 9″. Pp. 277. 17*s*. 6*d*.

[Reviewed in this issue.]

H.R.H. the Duke of Edinburgh's Study Conference on the Human Problems of Industrial Communities within the Commonwealth and Empire, Oxford, 1956. Vol. I: Report and Proceedings; Pp. 338. Vol. II: Background Papers, Appendices and Index; Pp. 339. London: Oxford University Press, 1957. 10″. 42*s.* per set.

[To be reviewed.]

EDDY (J. P.). The Law of Copyright. London: Butterworth, 1957. 9½″. Pp. 356. 35*s.*

[This is a new text-book describing the state of the law of copyright since the passage of the Copyright Act of 1956. An annotated text of the Act is included.]

FAWZI (SAAD ED DIN). The Labour Movement in the Sudan, 1946–1955. London: Oxford University Press for the Royal Institute of International Affairs, 1957. 9″. Pp. xiv + 175. 25*s.*

[To be reviewed.]

FREEMAN (T. W.). Pre-famine Ireland. A study in historical geography. Manchester: Manchester University Press, 1957. 9″. Pp. 352. 35*s.*

[To be reviewed.]

GILBERT (M.) and STONE (J. R. N.) for the International Association for Research in Income and Wealth. Income and Wealth, Series VI. London: Bowes & Bowes, 1957. 9″. Pp. 306. 42*s.*

[To be reviewed.]

Graduate Employment. A sample survey by PEP. London: Political and Economic Planning in conjunction with Allen & Unwin, 1956. 9″. Pp. 300. 30*s.*

[This volume is based on a questionnaire which was completed in the autumn of 1954 by 4,535 men (women were not covered) who graduated with a first degree in arts, science and technology in the academic year 1949–50. Of those included in the sample, 52% had taken a degree in arts, 28% in science and 20% in technology. Medicine, dentistry, agriculture and veterinary science were not covered by the survey. The greater part of the analysis deals with the employment of the graduates between the years 1950 and 1954. Many interesting details are given regarding such matters as starting salaries in the different occupations; salaries in relation to the class obtained by the graduate at his university; changes in employment, etc. It is however, regrettable that owing to the base year chosen for the inquiry (1949–50) more than 50% of all the men in question were found to be in receipt of Further Education and Training Grants, which means that they had served during the War. The result of this is that the sample is composed of a much higher proportion of older men than would normally be the case. In this important respect the sample cannot be regarded as typical.]

JENKS (C. W.). The International Protection of Trade Union Freedom. No. 35 in the Library of World Affairs, published under the auspices of the London Institute of World Affairs. London: Stevens, 1957. 10″. Pp. xl + 592. 84*s.*

[To be reviewed.]

KENDALL (M. G.) (Ed.). The Sources and Nature of the Statistics of the United Kingdom. Vol. II. London: Oliver & Boyd for the Royal Statistical Sodiety, 1957. 10″. Pp. 343. 30*s.*

[To be reviewed.]

LITTLE (I. M. D.). A Critique of Welfare Economics. Second edition. London: Oxford University Press, 1957. 9″. Pp. 302. 30*s.*

[To be reviewed.]

LUNDBERG (E.). Business Cycles and Economic Policy. Translated by J. POTTER. London: Allen & Unwin, 1957. 9″. Pp. xx + 346. 32*s.*

[To be reviewed.]

MACDOUGALL (SIR DONALD). The World Dollar Problem. A study in international economics. London: Macmillan, 1957. 9″. Pp. xvii + 622. 50*s.*

[To be reviewed.]

MAKOWER (H.). Activity Analysis and the Theory of Economic Equilibrium. London: Macmillan, 1957. 9″. Pp. xiv + 192. 25*s.*

[To be reviewed.]

MUNBY (D. L.). Home Ownership. Fabian Research Series, No. 188. London: The Fabian Society (11 Dartmouth Street, S.W.1.), 1957. 8½″. Pp. 33. 2*s.* 6*d.*

[The author first gathers together a wide range of information about the present extent of house-ownership and about the expenditure and saving patterns it is associated with. After an account of the sources of finance for house purchase, he then proceeds to the main issue of policy, whether owner-occupation should be encouraged. While not denying that a system of owner-occupation has certain genuine advantages, he is suspicious of attempts to extend the system too widely. He argues that a house is not the ideal form of investment for a small investor and that a multiplicity of small freeholds is an obstacle to rational town planning. Moreover, he does not like the idea of the sharp class distinction that will develop if present trends are continued, and everyone is either "working-class" and lives in a local-authority rented house or else is "middle-class" and owns his own house. The many anomalies in the housing market of the present day make it difficult to ascertain people's real preferences between rented and owner-occupied accommodation. As far as immediate policy is concerned, Mr. Munby argues that the most helpful step would be for local authorities to develop a housing service, providing advice to owner-occupiers and facilities for repairs insurance. The only element that smacks of prejudice in this well-reasoned and informative pamphlet on a highly controversial subject is the author's evident dislike of building societies, which a reader might well suppose from his account to be profit-making bodies.]

PANKHURST (R.). The Saint Simonians, Mill and Carlyle. A preface to modern thought. London: Sidgwick & Jackson, 1957. 8½″. Pp. x + 154. 21*s.*

[To be reviewed.]

Political Economy. A textbook issued by the Economics Institute of the Academy of Sciences of the U.S.S.R. Translated from the second Russian edition by C. P. DUTT and A. ROTHSTEIN. London: Lawrence & Wishart, 1957. 9″. Pp. xxii + 858. 21*s.*

[This is an English translation of the official Soviet text-book of economic theory, the first Russian edition of which was reviewed in the ECONOMIC JOURNAL of September 1955, p. 509, by A. Nove.]

POOL (A. G.) and LLEWELLYN (G.). The British Hosiery Industry. A study in Competition. Second report. Leicester: University College, 1957. 10″. Pp. 52. 7*s.* 6*d.*

[The first report on the research into the hosiery industry conducted by these authors under the Conditional Aid Scheme was noticed in the ECONOMIC JOURNAL of March 1956, p. 195. It dealt with competition in the industry. The subject of this second report is manufacturers' associations—their historical background, their structure and membership, their functions and their internal organisations. In this industry there is no question of associations being used to buttress the position of leading manufacturers or to establish a situation of oligopoly; on the contrary, by disseminating the results of research and conferring other such benefits on members, they help to put all firms on a similar footing and encourage effective competition between them. The authors believe that there is scope for useful extension of their functions, and they suggest in particular that good results would follow if wider support to the Research Association were forthcoming from manufacturers. At present only about a quarter of the firms in the industry subscribe to their Association. The authors also recommend the amalgamation of a number of competing associations in the industry, which at present duplicate one another's functions.]

PROUTY (R.). The Transformation of the Board of Trade, 1830–1855. A study of administrative reorganization in the heyday of laissez faire. London: Heinemann, 1957. 9″. Pp. 123. 15*s.*

[The subject of this monograph is the process by which the Board of Trade was transformed from an advisory committee of the Privy Council, as it was at the beginning of the nineteenth century, into an executive department of state, as it had become by 1855. The author's approach is that of a student of administration rather than that of an economic historian. He shows how industrial development left the government no alternative but to participate in many ways in economic affairs, notwithstanding the prevalance of *laissez-faire* ideas. Regulation of railways, collection of statistics and registration of joint-stock companies were among the functions taken over by the Board of Trade during this period. Another, which has hitherto been less studied than those just named, was the regulation of merchant shipping, and it is to this that Mr. Prouty devotes the greater part of his space. He enumerates at length the various legislative controls over shipping which were instituted during the period, and then describes how the legislation was eventually consolidated and its administration placed under the supervision of the Board of Trade instead of being divided amongst different departments as it had formerly been.]

RAMSAY (G. D.). English Overseas Trade during the Centuries of Emergence. Studies in some modern origins of the English-speaking world. London: Macmillan, 1957. 9″. Pp. 279. 30*s*.

[To be reviewed.]

Research in Unilever. London: Unilever, 1957. 8″. Pp. 17.

[This is an address delivered by the Chairman at the annual general meeting of Unilever on April 25, 1957. Among the aspects treated by the speaker are: the degree of centralisation of research effort within the Unilever group; the relative importance of long-range and short-range projects and of projects aimed to achieve a specific purpose and those where invention precedes recognition of the need; and, more briefly, the criteria used in deciding how much research to do and how to choose between different research projects when, as is usually the case, the number of potentially rewarding lines of inquiry is more than can be undertaken.]

SCAMMELL (W. M.). International Monetary Policy. London: Macmillan, 1957. 9″. Pp. 402. 40*s*.

[To be reviewed.]

SCHLESINGER (A. M.). The Age of Roosevelt. Volume I: The Crisis of the Old Order, 1919–1933. London: Heinemann, 1957. 9″. Pp. xi + 569. 42*s*.

[To be reviewed.]

SCOTT (W. H.), HALSEY (A. H.), BANKS (J. A.) and LUPTON (T.). Technical Change and Industrial Relations. A study of the relations between technical change and the social structure of a large steelworks. Department of Social Science, University of Liverpool, Social Research Series. Liverpool: Liverpool University Press, 1956. 9″. Pp. 326. 17*s*. 6*d*.

[To be reviewed.]

The Soviet Union in 1960. The story of the Sixth Five-Year Plan in action. Soviet News Booklet No. 1. London: Soviet News (3 Rosary Gardens, S.W.7), 1957. 8½″. Pp. 55. 6*d*.

[A popular descriptive account in glowing terms of the increases in production envisaged in the Sixth Five-Year Plan and what they will mean in terms of the standard of living.]

WILSON (J. S. G.). French Banking Structure and Credit Policy. London: Bell for the London School of Economics and Political Science, 1957. 9″. Pp. 453. 45*s*.

[To be reviewed.]

WINDETT (A. S.). The Changing East. LPE Papers, No. 5. London: London Press Exchange (110 St. Martin's Lane, W.C.2), 1957. 9½″. Pp. 32.

[The author's purpose is to describe for the benefit of British exporters the changes that have taken place in recent years in economic structure and policy in Eastern countries and to suggest how exporters had best organise their efforts in the light of these changes.]

American

ASHER (R. E.), KOTSCHNING (W. M.), BROWN (W. A.) and Others. The United Nations and Economic and Social Co-operation. Washington, D.C.: The Brookings Institution, 1957. 9″. Pp. xi + 561. $2.50.

[The authors survey in successive chapters the past and present activities of the United Nations in various spheres of activity in the economic and social fields: actions in emergency situations; international trade and payments; production and investment; full employment and economic stability; problems of under-developed countries, etc. Their survey forms a convenient source of reference both on the work done by or for the United Nations in these fields and on the discussion and criticism it has aroused. It incidentally provides a useful and discriminating guide to a large range of past United Nations publications.]

BARNA (T.) (Ed.). The Structural Interdependence of the Economy. Proceedings of an international conference on input–output analysis. New York: John Wiley (Milan: Giuffrè; London: Chapman & Hall), 1957. 10″. Pp. 429. 60*s*.

[To be reviewed.]

CHAMBERLIN (E. H.). The Theory of Monopolistic Competition. Seventh edition. Cambridge, Mass.: Harvard University Press (London: Oxford University Press), 1957. 8½″. Pp. xiv + 350. 30*s*.

[The principal change in this edition of Professor Chamberlin's classic work is the addition of a new supplement to the bibliography, covering the period May 1948 to May 1956 and including over 800 items.]

CLARK (J. B.). The Distribution of Wealth. A Theory of wages, interest and profits. Reprints of economic classics. New York: Kelley & Millman, 1956. 9″. Pp. 445. $8.50.

[J. B. Clark's principal work, *The Distribution of Wealth*, in which he sets forth with great elaboration the static marginal productivity theory of distribution, is the latest addition to Messrs. Kelley and Millman's series of photographic reprints.]

DOMAR (E. D.). Essays in the Theory of Economic Growth. New York and London: Oxford University Press, 1957. 8½″. Pp. 272. 36*s*.

[To be reviewed.]

DURAND (D.). Bank Stock Prices and the Bank Capital Problem. National Bureau of Economic Research, Occasional Paper 54. New York: National Bureau of Economic Research, 1957. 9″. Pp. 68. $1.00.

[The object of this paper is to establish by means of multiple regression analysis the factors determining the market prices of bank stocks in the United States in 1946–53, and hence the cost to banks of raising equity capital. As might be expected, dividends and earnings emerge as the chief factors. The relative importance of the two, however, differed substantially between different types of bank. A final chapter attempts to assess the effect of growth and capital appreciation. The results here are inconclusive.]

ERICKSON (C.). American Industry and the European Immigrant, 1860–1885. Cambridge, Mass.: Harvard University Press (London: Oxford University Press), 1957. 9½″. Pp. x + 269. 38*s*.

[To be reviewed.]

FRANKEL (M.). British and American Manufacturing Productivity. A comparison and interpretation. Urbana, Illinois: Bureau of Economic and Business Research, University of Illinois, 1957. 9″. Pp. 130. $1.50.

[To be reviewed.]

HORTON (D. C.). Patterns of Farm Financial Structure. A cross-section view of economic and physical determinants. Princeton, New Jersey: Princeton University Press for the National Bureau of Economic Research (London: Oxford University Press), 1957. 9″. Pp. 185. 36*s*.

[To be reviewed.]

HUR (J. J.) (Ed.). Chemical Process Economics in Practice. New York: Reinhold Publishing Corporation, 1956 (London: Chapman & Hall, 1957). 7½″. Pp. 115. 32*s*.

[This contains the proceedings of a symposium at which a number of speakers, all of them engaged in business, discussed the relevance of various accounting and economic concepts and methods to the practical work of the chemical engineer.]

KLOPSTOCK (F. H.). The International Status of the Dollar. Essays in International Finance, No. 28. Princeton, New Jersey: International Finance Section, Princeton University, 1957. 9″. Pp. 26.

[The subject of this paper is the great recent rise in foreign dollar assets and their role as monetary reserves for the world outside the United States. The author describes the composition of these assets—the countries holding them, official versus private holdings, the form in which they are held—and the implications of the movement towards a "dollar exchange standard" which the increase in them represents. In Mr. Klopstock's view the development is a healthy one, capable of benefiting both the United States and other countries. The United States' very large gold holdings make her well equipped to act as an international reserve centre. The existence of a large volume of foreign liquid assets is liable to create certain problems for the United States' domestic monetary policy, but the author does not believe that these problems are likely to present any insurmountable difficulty.]

KNORR (K.). The War Potential of Nations. Princeton, New Jersey: Princeton University Press, 1956 (London: Oxford University Press, 1957). 9¼". Pp. 310. 40*s*.

[Reviewed in this issue.]

KOMAROVSKY (M.) (Ed.). Common Frontiers of the Social Sciences. Glencoe, Illinois: The Free Press and the Falcon's Wing Press, 1957. 9¼". Pp. 439. $6.00.

[The purpose of this volume is to explore the common frontiers of the social sciences not by means of general methodological essays but " by means of a scrutiny, and frequently a reciprocal scrutiny, of some one specific topic or a group of studies in overlapping areas of research." This is what the contributors were invited to do. Part I deals with topics in history and social research; Part II, which deals with economics and sociology, includes the following items: Plant Sociology—The Elite and the Aborigines, by Clark Kerr and Lloyd Fisher; Plant Sociology—Real Discoveries and New Problems, by C. M. Arensberg.]

LAMER (M.). The World Fertilizer Economy. Stanford University Food Research Institute, studies on Food, Agriculture and World War II. Stanford, California: Stanford University Press (London: Oxford University Press), 1957. 9¼". Pp. xvi + 715. 100*s*.

[To be reviewed.]

MASON (E. S.). Economic Concentration and the Monopoly Problem. Harvard Economic Studies, Vol. C. Cambridge, Mass.: Harvard University Press (London: Oxford University Press), 1957. 8½". Pp. xi + 411. 48*s*.

[To be reviewed.]

Measurement and Behavior of Unemployment. A Conference of the Universities-National Bureau Committee for Economic Research. Princeton, New Jersey: Princeton University Press for the National Bureau of Economic Research (London: Oxford University Press), 1957. 9¼". Pp. 605. 60*s*.

[To be reviewed.]

New England Textiles and the New England Economy. Reports by the New England Governors' Textile Committee to the Conference of New England Governors, with a Research Report by S. E. HARRIS. Cambridge, Mass.: New England Governors' Textile Committee, 1957. 11". Pp. 30 + 179. $3.00.

[This is an annual report. 1956 was a reasonably good year, but the industry continued to lose some ground. This partly reflected the declining importance of textiles in the national economy as a whole and partly difficulties peculiar to New England. Southern textile mills continue to show much better results than those in New England, notwithstanding that the wage-differential between the two regions in most branches of textiles has now ceased to be important.]

OAKS (C.). Managing Suburban Branches of Department Stores. Stanford University Graduate School of Business, Business Research Series No. 10. Stanford, California: Graduate School of Business, Stanford University, 1957. 9". Pp. 90. $2.50.

[The development of large suburban branches has in recent years given a new lease of life to the department store in the United States. The author examines the management problems created by this major change in department store organisation, with particular reference to the functions of the buyer.]

POLYANYI (K.), ARENSBERG (C. M.) and PEARSON (H. W.) (Eds.). Trade and Market in the Early Empires. Economics in history and theory. Glencoe, Illinois: The Free Press, 1957. 8½". Pp. xviii + 382. $6.00.

[This book, the result of an interdisciplinary research project, consists of eighteen essays by eleven authors, all bearing on the thesis that economic theory does not provide an adequate conceptual framework for the study of primitive economies because it is based on irrelevant institutional assumptions. It is argued that the price-making markets which provide the rationale for economic analysis became an important feature of economic life only in the relatively recent past and in western-type economies. For all other societies and periods the economic process is too deeply imbedded in the social process to be independently analysed, and those who study primitive economies in terms of the market model are trying to fill empty sociological boxes. Empirical evidence for the hypothesis that price-making markets are a recent and relatively exceptional phenomenon is provided in the form of studies of trade and market institutions for communities

as distant in time and place as ancient Mesopotamia, the Aztec Empire, eighteenth-century Dahomey, nineteenth-century India and the twentieth-century Berber Highlands. The book is directed towards economic sociologists and economic historians. Economists will find this reconsideration of economy and society stimulating and suggestive, but they are unlikely to find much practical or theoretical use for the new conceptual tools suggested by the authors.]

Problems of Capital Formation. Concepts, measurement and controlling factors. Studies in Income and Wealth, Vol. 19. Princeton, New Jersey: Princeton University Press for the National Bureau of Economic Research (London: Oxford University Press), 1957. 9½″. Pp. 609. 60*s*.

[To be reviewed.]

Problems in the International Comparison of Economic Accounts. Studies in Income and Wealth, Volume 20, by the Conference on Research in Income and Wealth. Princeton New Jersey: Princeton University Press for the National Bureau of Economic Research (London: Oxford University Press), 1957. 9″. Pp. 404. 63*s*.

[To be reviewed.]

Regional Income. Studies in Income and Wealth, Volume Twenty-one, by the Conference on Research in Income and Wealth. Princeton, New Jersey: Princeton University Press for the National Bureau of Economic Research (London: Oxford University Press), 1957. 9″. Pp. 405. 63*s*.

[To be reviewed.]

Rosenbluth (G.). Concentration in Canadian Manufacturing Industries. National Bureau of Economic Research, General Series No. 61. Princeton, New Jersey: Princeton University Press for the National Bureau of Economic Research (London: Oxford University Press), 1957. 9″. Pp. xv + 152. 28*s*.

[Reviewed in this issue.]

Schultz (H.). The Theory and Measurement of Demand. Chicago, Illinois: Chicago University Press (London: Cambridge University Press), 1957. 9½″. Pp. xxix + 817. 94*s*.

[This famous pioneering work, which first appeared in 1938, is now again made available. It was reviewed in the Economic Journal of September 1939, p. 486, by J. Marshak.]

Simon (H. A.). Models of Man, Social and Rational. Mathematical essays on rational human behaviour in a social setting. New York: John Wiley (London: Chapman & Hall), 1957. 9½″. Pp. xii + 287. 40*s*.

[To be reviewed.]

Soth (L.). Farm Trouble. Princeton, New Jersey: Princeton University Press (London: Oxford University Press), 1957. 9″. Pp. vii + 221. 30*s*.

[To be reviewed.]

Stark (H.). Modern Latin America. University of Miami, Publications in Economics No. 2. Coral Gables, Florida: University of Miami Press, 1957. 8½″. Pp. 321. $2.50.

[The author's particular interest is the relationship between the Latin American countries and the United States. Much of his book is taken up with discussion of political developments in the region. The treatment of economic topics is for the most part descriptive rather than analytical.]

Steiner (P. O.) and Dorfman (R.). The Economic Status of the Aged. A publication of the Institute of Industrial Relations of the University of California. Berkeley and Los Angeles: University of California Press (London: Cambridge University Press), 1957. 9½″. Pp. xii + 296. 37*s*. 6*d*.

[To be reviewed.]

Stelson (H. E.). Mathematics of Finance. Princeton New Jersey: Van Nostrand (London: Macmillan), 1957. 9½″. Pp. xii + 327. 40*s*.

[This is a text-book, designed for the use of American college students, dealing with the problems involved in calculations relating to compound interest, annuities, instalment purchases, insurance premiums, etc.]

TAYLOR (A. G.). Labor and the Supreme Court. Williamsburg, Virginia: published by the author (Social Science Division, College of William and Mary), 1957. 9″. Pp. 178.

[The author's purpose is to provide a concise account of the state of the law pertaining to labour–management relations in the United States. The leading cases on each of the chief topics are presented in chronological order.]

WALTER (J. E.). The Role of Regional Security Exchanges. A publication of the Bureau of Business and Economic Research of the University of California. Berkeley and Los Angeles: University of California Press (London: Cambridge University Press), 1957. 9½″. Pp. 170. 22*s.* 6*d.*

[In this volume the regional security exchanges in the United States are analysed in terms of share turnover, commission charges and numbers of shares listed. It is noted that a great deal of their activity consists of dealing in shares also quoted on one the national stock exchanges and that judging by their effectiveness in making a regional market for regional issues, their performance is disappointing. The main reason for this is the competition of the over-the-counter market in which the great majority of brokers on the provincial exchange also operate as dealers and in which their greater freedom to vary their charges and act as principals gives better opportunities for profit making. That new issues are all first made on the over-the-counter market and that it is possible for dealers to attract business by aggressive selling are further factors in its favour. The scope for possible improvements in regional exchanges is discussed with particular reference to mergers on the pattern of the Midwest exchange. This is a useful survey, although the role of these exchanges is discussed in rather narrow terms.]

WEATHERFORD (W. D.). Geographical Differentials of Agricultural Wages in the United States. Harvard Studies in Labor in Agriculture. Cambridge, Mass.: Harvard University Press for the Harvard Graduate School of Public Administration (London: Oxford University Press), 1957. 9″. Pp. 99. 10*s.*

[In this carefully argued monograph the author shows that the pattern of inter-regional differentials in the wages paid to hired labour on farms in the United States has remained remarkably stable since the Civil War. Farm wage-rates are lowest in South Carolina, and rise gradually in all directions as we recede from there, the highest rates being paid in the North-west. The productivity of labour on farms in each region naturally corresponds broadly to the rate of wages paid there. In interpreting this phenomenon the author reaches the rather surprising conclusion that the most important factor responsible for differences between regions in the supply of farm labour, and hence in the rate of wages, is differences in birth-rates. Migration away from rural districts has, of course, been a factor of great importance in determining the size of the rural labour force in all districts, but inter-regional differences in the rate of townward migration have not been sufficient to outweigh inter-regional birth-rate differences.]

WEBER (A). Theory of the Location of Industries. Translated with an introduction and notes by C. J. FRIEDRICH. Chicago, Illinois: Chicago University Press (London: Cambridge University Press), 1957. 8″. Pp. xxxiii + 256. 37*s.* 6*d.*

[This is a reprint of a translation which was first published in 1929.]

Australian

South Pacific Enterprise. The Colonial Sugar Refining Company, Ltd. Sydney and London: Angus & Robertson, 1956. 9½″. Pp. xvii + 500. 42*s.*

[This elaborately produced and illustrated centenary volume is the work of a number of different authors, some of them connected with the company, some not. Each chapter deals with a different aspect of its activities. The book is not primarily a history, but the historical chapters are among the most interesting. One of the chief themes is the decisive role played by the two leading personalities of the company's history, Edward Knox and E. V. Knox, in shaping its character and development.]

Canadian

HARRISON (W. E. C.). Canada in World Affairs, 1949–1950. Toronto: Oxford University Press for the Canadian Institute of International Affairs (London: Oxford University Press), 1957. 9″. Pp. 374. 32*s.*

[This is one of a series of biennial surveys of international affairs since the end of the War as they affected Canada. The bulk of the book is concerned with political issues, in particular the development of NATO and the outbreak of war in Korea, but an extensive account is included of the devaluation of 1949 looked at from the Canadian point of view.]

INNIS (H. A.). Essays in Canadian Economic History. Edited by Mary Q. Innis. Toronto: University of Toronto Press, 1956 (London: Oxford University Press, 1957). 9½″. Pp. 418. 68*s*.

[To be reviewed.]

German

ALBERS, W. Die Einkommensbesteuerung in Frankreich seit dem Ersten Weltkrieg. Kiel: Institut für Weltwirtschaft, 1957. 9½″. Pp. x + 320. DM. 36.

WEISE, H. Die Steuern im Vereinigten Königreich. Kiel: Institut für Weltwirtschaft, 1957. 9½″. Pp. xiii + 360 and a separate set of tables. DM. 40.

[These monographs on the French and English fiscal system set high standards of exposition and production. The first deals with French income tax from its introduction to 1955, the second with the development of the whole fiscal system in the United Kingdom over the same period 1920–55. Basically, both books consist of a highly detailed and to all appearances accurate compendium of fiscal measures; comparative tables and appendices which summarise the development during the period under review are liberally provided.]

BAADE, (E.). Die Lage der Weltwirtschaft und ihre Bedeutung fur die Landwirtschaft. Kiel: Institut für Weltwirtschaft, 1957. 9½″. Pp. 26.

[A short lecture in which Professor Baade reviews the long-term prospects of world agriculture and reiterates his belief that production in at present underdeveloped areas will show a fast growth in the next decades.]

VOCKE, WILHELM. Gesundes Geld. Frankfurt: Fritz Knapp, 1956. 8″. Pp. 147.

[A collection of essays, speeches and newspaper articles by the Governor of the German National Bank, mainly concerned with current financial problems, and reflecting traditional banking views.]

Swiss

ERBE (R.). Die "Sterling-Area" nach dem Zweiten Weltkrieg. Zürich: Polygraphischer Verlag, 1955. 8½″. Pp. vii + 164. S. Frs. 12.80.

[A description of the working arrangement of the sterling area, followed by a survey of its successive crises in the years 1946–50. The book was completed in manuscript in 1951 and has not been revised since.]

MÜLLER (A. O.). Die Verstaatlichung des Britischen Kohlenbergbaus. Zürich: Polygraphischer Verlag, 1955. 8″. Pp. xii + 164. S. Frs. 10.35.

[The nationalisation of the coal industry and the subsequent experience of the National Coal Board up to 1955 are treated mainly by a painstaking survey of the legislative and administrative aspects. In a short summing up at the end the author concludes that present achievements towards the nationalisation's stated objectives could equally well have come about without it.]

SANNWALD (R.). Marx und die Antike. Zürich: Polygraphischer Verlag, 1957. 8″. Pp. 211. S. Frs. 14.50.

[This study, which traces the influence of the classics, on Marx's thought, is of specific historic and philosophic rather than of economic interest.]

Dutch

ANDRIESSEN (J. E.). De ontwikkeling van de moderne prijstheorie. Leiden: Stenfert Kroese, 1955. 9″. Pp. 285.

[The major part of this doctoral thesis on the development of modern price theory is devoted to a survey of English and American writing on the subject since Marshall. Particular attention is paid to the controversy over marginal cost versus full cost principle. In the latter half of the book the author puts forward his own contribution to the problem. The essence of his argument is that the cost curve may be expected to be horizontal, at least in the neighbourhood of the prevailing locus. This will make marginal cost coincide with average (variable) cost, and with suitable demand conditions determining the profit margin or mark-up it will lead to a situation where the marginal-cost and full-cost principles are indistinguishable.]

Danish

WINDING (P). Some Aspects of the Acceleration Principle. Copenhagen: Einar Harcks; Amsterdam: North Holland Publishing Company, 1957. 10″. Pp. 254. 30.50 guilders.

[To be reviewed.]

Swedish

FAXÉN (K. O.). Monetary and Fiscal Policy under Uncertainty. Stockholm Economic Studies, New Series, No. 1. Stockholm: Almqvist & Wiksell, 1957. 9½″. Pp. 212. Sw. kr. 20.

[To be reviewed.]

Finnish

KASKIMIES (M.). Kulutustavaroiden Jakeluteiden Rakenne. Helsinki: Liiketaloustieteellinen Tutkimuslaitos, 1955. 10″. Pp. 344. With a summary in German.

[The object of this book is to explain the structure of consumers goods' distribution. There is a good deal of distinction made between objective and subjective factors, or quantitative and qualitative elements, and so on, each category being discussed at length. Little (but some) empirical evidence is used. In the end the result is classificatory rather than explanatory.]

VIRKKUNEN (H.). Das Rechnungswesen im Dienste der Leitung. Helsinki: Liiketaloustieteellinen Tutkimuslaitos, 1956. 10″. Pp. 146.

[In industry, accounting is a tool of management, and its functions correspond to various specific aspects of policy and control. This theme and some of its implications are extensively and rather abstractly discussed in this book.]

Russian

LENIN (V. I.). The Development of Capitalism in Russia. Moscow: Foreign Languages Publishing House, 1956 (London: Lawrence & Wishart, 1957). 8″. Pp. 751. 9*s.* 6*d.*

[This is the first English translation in full of the famous work written by Lenin in Siberian exile at the end of last century. Previously no more than selected passages of it, comprising rather less than a quarter of the whole, have been rendered into English. It was first published in Russia in 1899 with a print of 2,400 copies and had a second edition in 1908, on which this translation is based. The book has as sub-title, " The Process of the Formation of a Home Market for Large-scale Industry," which strikes the keynote of the particular controversy in the context of which it was written. In this controversy he was opposing the standpoint of the Narodniks, who preached a kind of Gandhian philosophy of anti-capitalism and anti-industrialism, hoping to build a sort of agrarian communism on the basis of the traditional institutions of the Russian village. In economic theory they held a position somewhat akin to that of Rodbertus or (later) of Rosa Luxemburg: industry could develop only " artificially " on the basis of an export market owing to the narrowness of the internal market (whence Lenin's sub-title). English readers may find it strange to meet Lenin here as a defender of " the progressive historical role of capitalism " and a critic of under-consumption views (on the ground that it is a characteristic of capitalism for investment in technical innovation to take the lead, and hence for " production to expand without a corresponding expansion in consumption "). But the main part of the book is concerned with an exhaustive analysis of the condition of the Russian peasantry, on the basis of the Zemstvo statistics of the time, with particular emphasis on the social differentiation of the peasantry and the emergence of embryo-capitalism in the shape of labour-employing *kulaks* in both agriculture and village handicrafts. It was this social analysis of the peasantry that was to play such a prominent part in the ideas and policies of the Russian Revolution and after.]

Israel

CREAMER (D.) and others. Israel's National Income, 1950–1954. Jerusalem: Falk Project for Economic Research in Israel (24 Hillel Street) and Central Bureau of Statistics, 1957. 9½″. Pp. 115. $2.00.

[About half of this consists of summary and interpretation of results and the remainder of detailed tables and notes on sources and methods. The method of estimation used is summation of the value added in each industrial branch of the economy, the latter in turn being calculated by

summing the returns to labour and capital in the branch concerned, except in the case of agriculture, where the estimate is based on gross receipts minus purchases from outside. Dr. Creamer uses the results to cast light on trends in national income in real and money terms, in unrequited transfers as a percentage of national income, in the industrial structure of the economy and in value added per worker in different sectors of the economy.]

THE FALK PROJECT FOR ECONOMIC RESEARCH IN ISRAEL. Third Annual Report, 1956. Jerusalem: Falk Project for Economic Research in Israel (24 Hillel Street), 1957. 9½". Pp. 57.

[The Falk Project has the two main objectives of carrying out research into the economic problems of Israel and providing research training opportunities for Israeli scholars. This report describes the work which it has at present under way. It includes quite detailed accounts of findings to date.]

Official

BRITISH

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD. Domestic Food Consumption and Expenditure, 1955. Annual Report of the National Food Survey Committee. London: H.M. Stationery Office, 1957. 9½". Pp. 148. 6*s.* 6*d.*

[This year's report contains the wide range of detailed statistics and analysis that has become customary in this series. The present issue provides more elaborate treatment than its predecessors in a number of respects: the diets of different household types within each social class are distinguished for the first time, the regional analysis is extended and there is a preliminary study of occupational differences in relation to food expenditure and consumption.]

PREST (A. R.). A Fiscal Survey of the British Caribbean. Colonial Research Studies, No. 23. London: H.M. Stationery Office, 1957. 9½". Pp. 136. 10*s.*

[Reviewed in this issue.]

CANADIAN

BARBER (C. L.). The Canadian Electrical Manufacturing Industry. Ottawa: Royal Commission on Canada's Economic Prospects, 1956. 10". Pp. 87.

[This is one of a series of some thirty studies on aspects of the Canadian economy which are being prepared by different authors at the request of the Royal Commission on Canada's Economic Prospects. The greater part of the study is occupied by a survey of the Canadian market for electrical apparatus. Canadian electrical manufacturers, who are protected by tariffs with an average rate of approximately 21%, at present supply about three-quarters of the electrical equipment used in the country. The limited size of the market prevents the industry from exploiting the economies of scale available to its competitors in the United States, especially in heavier appliances, and the author believes that there are an excessive number of producers in most lines in relation to the size of the market. 65% of the industry's assets are owned by foreign investors, and a slightly larger proportion is under the control of individuals or companies abroad, chiefly in the United States.]

RESTRICTIVE TRADE PRACTICES COMMISSION, DEPARTMENT OF JUSTICE, OTTAWA. Report Concerning the Sugar Industry in Western Canada and a Proposed Merger of Sugar Companies. Ottawa: Department of Justice, 1957. 10". Pp. 202.

[The subject of this report is the projected acquisition of control of the Manitoba Sugar Company by the British Columbia Sugar Refining Company. The latter already enjoys a virtual monopoly in the sale of sugar in parts of Western Canada, but the Mantioba Company supplies a substantial part of the sugar sold in Manitoba and a small part of the sugar sold in Saskatchewan. The conclusion is reached that the proposed acquisition would reduce competition to the detriment of the public interest. It had been contended on behalf of the British Columbia Sugar Refining Company that the proposed merger would lead to more efficient conduct of the Manitoba sugar-refining factory.]

AMERICAN

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM. Consumer Instalment Credit. Part I: Growth and Import: Vol. 1, Pp. 388, $1.25; Vol. 2, Pp. 287, $1.00; Part II: Conference on Regulation, prepared under the auspices of the National Bureau

of Economic Research: Vol. 1, Pp. xxvi + 553, $1.75; Vol. 2, Pp. 161, $0.60; Part III: Views on Regulations, Pp. 230, $1.00; Part IV: Financing New Car Purchases, a National Survey for 1954–55; Pp. xii + 151, $0.60. Washington, D.C.: U.S. Government Printing Office, 1957.

[To be reviewed.]

INTERNATIONAL

BANK FOR INTERNATIONAL SETTLEMENTS. Twenty-seventh Annual Report. Basle: Bank for International Settlements, 1957. 11½". Pp. 250.

[In addition to the usual survey of economic developments during the year, with particular reference to developments in the monetary sphere, this year's report contains as special features a study of the processes of saving and investment in the chief countries of Western Europe and an account of the banking operations carried out by the Bank for International Settlements during the years 1947–57.]

INTERNATIONAL MONETARY FUND. Eighth Annual Report on Exchange Restrictions, 1957. Washington, D.C.: International Monetary Fund, 1957. 9". Pp. 375.

[This report consists mainly of a detailed account of changes in national regulations. The introduction surveys events of the year in general terms and reports continued movement towards the establishment of a freer multilateral system of trade and payments.]

INTERNATIONAL TIN STUDY GROUP. Statistical Yearbook 1956. The Hague: International Tin Study Group, 1956. 10½". Pp. 284. 40*s*.

[This fourth yearbook is not a mere repetition of that of two years ago, though some 170 out of its 280 pages are occupied by statistics of the production and trade in tin, tin metal and tinplate, etc., in every country of the world, which has always and properly been the core of its predecessors. The first thirty-five pages contain the usual review of the world position, but this review is here extended to the whole period since 1946, and there is also in Part I, Section III, a short but interesting " assessment of tin consumption," which is a new feature explaining the basis of estimates and the degree of accuracy of the published figures. Then come the statistics of tin and tinplate by countries, but this is followed by a Part II of some seventy-five pages on canning, or more specifically on the Canned Food Industry and Trade, viewed globally and then by countries. This is a notable addition to this volume as a reference book. Here are a few surface scratchings from this mine of information. Tin consumption in the rest of the world outside the United States and the United Kingdom has risen from an average of 42,800 tons for 1946–50 to 64,900 tons for 1951–55, with 1955 the highest year at 71,800 tons. " The great bulk " of the 280,000 tons excess of production over commercial consumption since 1947 has gone into the United States strategic stockpile. Pre-war production of tinplate, at about 4 million tons, used 60,000 tons of tin: in 1955 it was 6·8 million tons and used 63,000 tons of tin. The highest grade of tinplate has ¼ lb. of tin per 100 lb. of plate. Production of canned food has risen to nearly twice that of 1938. The canning of beer now absorbs one-sixth of all cans made in the United States. Such items will perhaps whet the reader's appetite for more serious study.]

INTERNATIONAL WHEAT COUNCIL. World Wheat Statistics, 1957. London: International Wheat Council (Haymarket House, Haymarket, S.W.1.), 1957. 11". Pp. 83. 20*s*.

[This is the third issue in its series. Statistics are given for the period from 1949/50 up to April 1957, covering production of wheat, trade, supply and distribution in exporting countries, prices and ocean freight rates.]

UNITED NATIONS. Demographic Yearbook, 1956. New York: United Nations Department of Economic and Social Affairs, 1957. 11½". Pp. 744. 50*s*.

[The Yearbook opens with a survey chapter on the world demographic situation. It is estimated that world population is in the region of 2,700 million and that it is growing at a rate of 1·6% per annum. Special features of this year's issue include tables showing population by religion, language, ethnic group, country of birth and country of citizenship, and statistics on the age, sex, industry, occupation and status characteristics of the economically active population.]

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